

Benjamin B. McMillan

CONTACT INFORMATION	Institute for Basic Science, Center for Complex Geometry, B259 Daejeon, South Korea	<i>Phone:</i> +82 10 4169 5095 <i>E-mail:</i> mcmillan@ibs.re.kr <i>Web:</i> benmcmillan.net
RESEARCH INTERESTS	Cartan's method of equivalence, exterior differential systems, conservation laws, geometric structure of differential equations, invariant differential operators, singular foliations, quasiconformal geometry.	
EDUCATION	UC Berkeley , Berkeley, CA Ph.D., Mathematics, August 2010–May 2016 • Dissertation: “Geometry and Conservation Laws for a Class of Second-Order Parabolic Equations” • Advisor: Robert L. Bryant • National Science Foundation Graduate Research Fellowship, 2011 California Institute of Technology , Pasadena, CA B.S. with honors, Mathematics, August 2006 – May 2010	
ACADEMIC EXPERIENCE	Senior Researcher August 2022 – Present <i>Institute for Basic Science, Center for Complex Geometry</i> , Daejeon, South Korea <i>Session Organizer, with Paul-Andi Nagy</i> October 2025 Special Session “Symmetry and Integrability of Geometric Structures”, 2025 KMS Annual Meeting <i>Referee</i> New Zealand Journal of Mathematics <i>Reviewer</i> American Mathematical Society, Mathematical Reviews Australian Research Council Grant Funded Researcher September 2019 – May 2022 <i>University of Adelaide</i> , Adelaide, South Australia <i>Co-organizer, with Thomas Leistner</i> August 2021 – May 2022 Differential Geometry Seminar <i>Course Coordinator and Lecturer</i> March 2021 – June 2021 Analysis and Topology RTG Postdoctoral Fellow August 2016 – June 2019 <i>Stony Brook University</i> , Stony Brook, New York, USA <i>Founding Organizer</i> August 2017 – December 2017 Exterior Differential Systems and Method of Equivalence Seminar <i>Course Coordinator and Lecturer</i> August 2016 – June 2019 Overview of Calculus, Differential Geometry of Curves and Surfaces, Ordinary Differential Equations, Introduction to Linear Algebra, Honors Linear Algebra <i>Lecturer</i> August 2018 – December 2018	

Calculus I

REU Mentor

May 2017 – July 2017

Ricky Simanjuntak, calibrated planes in the Lie algebra of $SU(n)$ and the minimal cycles they determine.

Graduate Student

August 2010 – May 2016

UC Berkeley, Berkeley, California, USA

Course Coordinator and Lecturer

June 2011 – August 2011

Summer Semester Multivariable Calculus

Founding Organizer, with Christian Hilaire

September 2012 – December 2013

Student Differential Geometry Seminar

Teaching Assistant

August 2010 – May 2016

Pre-calculus, Calculus, Multivariable Calculus, Introductory Analysis, Discrete Math

Mentorship

UC Berkeley's directed reading program, guided undergraduates in self study of the topics:

- Galois Theory August 2014 – December 2014
- Classification of complex semi-simple Lie algebras January 2015 – May 2015
- Algebraic Topology January 2016 – May 2016

Tutor

January 2012 – December 2012

UC Berkeley's New Experiences for Research & Diversity in Science

Undergraduate Student

August 2006 – May 2010

California Institute of Technology, Pasadena, CA

Undergraduate Research

Research in Stochastic Evolution Equations

June 2009 – August 2009

Research in Graph Theory

June 2007 – August 2007

Tutor

August 2009 – May 2010

Undergraduate Peers

PUBLICATIONS

L. MacDonald, B. McMillan, Chern–Weil theory for singular Haefliger foliations, *Differential Geom. Appl.*, to appear, (arXiv:2106.10078).

F. Costanza, M. Eastwood, T. Leistner, B. McMillan, A Calabi operator for Riemannian locally symmetric spaces, *Amer. J. Math.*, 148 (4) (2026), 1003–1028.

F. Costanza, M. Eastwood, T. Leistner, B. McMillan, The range of a connection and a Calabi operator for Lorentzian locally symmetric spaces, *Asian J. Math.*, 29 (2) (2025), 171–200.

B. McMillan, Geometry and conservation laws for a class of second-order parabolic equations II: conservation laws, *SIGMA Symmetry Integrability Geom. Methods Appl.*, 17:Paper No. 047, 24, 2021.

B. McMillan, Geometry and conservation laws for a class of second-order parabolic equations I: geometry, *J. Geom. Phys.*, 157:103824, 29, 2020.

C. Y. Ku and B. McMillan, Independent sets of maximal size in tensor powers of vertex transitive graphs, *J. Graph Theory*, 60 (4) (2009), 295–301.

Submitted:

B. McMillan, Indecomposable quasiconformal maps of manifolds, arXiv:2605.21894.

B. McMillan, Foliation surgeries and the concordance groups of foliated spheres, arXiv:2511.09053.

B. McMillan, A characterization of Pfaffian embeddings from $(2,3,5)$ - into flat $(4,7)$ -geometries, arXiv:2404.14988.

SELECTED TALKS	<i>Foliation surgeries and Godbillon–Vey spheres,</i> Topology Seminar, Purdue University (online), invited	1/21/2026
	<i>Foliation surgery and continuous variation of characteristic classes on spheres,</i> Special Session, Symmetry and Integrability of Geometric Structures, KMS Annual Meeting	10/23/2025
	<i>Secondary characteristic classes and Chern–Weil theory of singular foliations,</i> Three-lecture series, Complex Geometry Seminar, IBS CCG, Daejeon	5/20–22/2025
	<i>Invariant prolongation of the conformal Killing equation via conformal tractors,</i> Geometry Session, KMS Spring Meeting	4/25/2025
	<i>Embeddable $(2,3,5)$ distributions,</i> Workshop on Parabolic Geometry and Related Topics, IBS CCG, Daejeon, invited	10/18/2023
	<i>The image of the Killing operator,</i> Complex Geometry Seminar, IBS CCG, Daejeon	9/15/2022
	<i>Calabi operators for locally symmetric spaces,</i> QMAP Seminar, UC Davis (online), invited	1/28/2022
	<i>The secondary characteristic classes of singular foliations,</i> Special Session, Geometry with Symmetries, AustMS Annual Meeting	12/8/2021
	<i>Conservation laws and parabolic Monge–Ampère equations,</i> Special Session, Geometry of Differential Equations, AMS JMM, invited	1/17/2020
	<i>Conservation laws and parabolic Monge–Ampère equations,</i> Special Session, Geometry including Differential Geometry, AustMS Annual Meeting	12/5/2019
	<i>Conservation laws and the moduli space of solutions to PDE,</i> Topology Seminar, Ohio State University, invited	3/7/2019
	<i>Conservation laws and parabolic Monge–Ampère equations,</i> Geometry/Topology Seminar, Stony Brook University	9/25/2018
	<i>The geometry and conservation laws of parabolic equations,</i> Topology Seminar, Ohio State University, invited	10/25/2016
	<i>The geometry and conservation laws of parabolic equations,</i> Geometric Analysis seminar, Rutgers, invited	9/27/2016
	<i>Moving frames and geometric invariants,</i> Graduate Student Topology and Geometry Conference, UT Austin	4/5/2014
	<i>The Newlander–Nirenberg theorem,</i> The Cartan Seminar, Stanford	2/27/2014