

Travis Willse

2023 March 1

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Guilford College
Mathematics Department
5800 W Friendly Ave
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- RESEARCH INTERESTS **Differential geometry:** geometric structures, conformal geometry, projective differential geometry, tractor geometry, parabolic geometries, invariant differential operators, the Fefferman-Graham ambient construction, special holonomy
- PROFESSIONAL APPOINTMENTS **Visiting assistant professor** **2021–**
Mathematics Department, Guilford College, Greensboro, U.S.A.
- Visiting assistant professor** **2020–2021**
Department of Mathematical Sciences, Lewis & Clark College, Portland, U.S.A.
- Visiting scholar** **2019–2020**
Centro de Investigación en Matemáticas, Guanajuato, Mexico
- Research assistant—postdoc** **2018**
Faculty for Mathematics, University of Vienna, Vienna, Austria
– Project: Dynamical methods in CR geometry
- Simons Semester postdoc** **2017**
Banach Center, Institute of Mathematics, Polish Academy of Sciences, Warsaw, Poland
– Program: Simons Semester: Symmetry and Geometric Structures
- Research assistant—postdoc** **2015–2018**
Faculty for Mathematics, University of Vienna, Vienna, Austria
– Project: New directions in the theory of BGG sequences
- Postdoctoral research fellow** **2011–2015**
Centre for Mathematics and Its Applications, Mathematical Sciences Institute, The Australian National University, Canberra, Australia
- EDUCATION **University of Washington**, Seattle, U.S.A.
Ph.D., mathematics, 2011
M.S., mathematics, 2010
- PUBLICATIONS [1] A.R. Gover, K. Neusser, T. Willse, Projective geometry of 3-Sasaki structures, submitted.
[arXiv:2204.08384](https://arxiv.org/abs/2204.08384)

- [2] G. Bor, T. Willse, Chains of path geometries on surfaces: theory and examples, *Israel J. Math.*, to appear.
arXiv:2201.09141
- [3] A.R. Gover, K. Neusser, T. Willse, Projective geometry of Sasaki-Einstein structures and their compactification, *Dissertationes Math.* **546** (2019), 1–64.
arXiv:1803.09531
- [4] T. Willse, Homogeneous real $(2, 3, 5)$ distributions with isotropy, *SIGMA Symmetry Integrability Geom. Methods Appl.* **15** (2019), 1–28.
arXiv:1807.02734
- [5] T. Willse, Cartan’s incomplete classification and an explicit ambient metric of holonomy G_2^* , *Eur. J. Math.* **4** (2018), 622–638.
arXiv:1411.7172
- [6] K. Sagerschnig, T. Willse, The almost Einstein operator for $(2, 3, 5)$ distributions, *Arch. Math. (Brno)* **53** (2017), 347–370.
arXiv:1705.00996
- [7] A.R. Gover, R. Panai, T. Willse, Nearly Kähler Geometry and $(2, 3, 5)$ -Distributions via Projective Holonomy, *Indiana Univ. Math. J.* **66** (2017), 1351–1416.
arXiv:1403.1959
- [8] K. Sagerschnig, T. Willse, The Geometry of Almost Einstein $(2, 3, 5)$ Distributions, *SIGMA Symmetry Integrability Geom. Methods Appl.* **13** (2017), 1–56.
arXiv:1606.01069
- [9] M. Davies-Walczak, A.C. Mix, T. Willse, et al., Correction of non-intrusive drill core physical properties data for variability in recovered sediment volume, *Geophys. J. Int.*, **202** (2015), 1317–1323.
- [10] T. Willse, Highly symmetric 2-plane fields on 5-manifolds and 5-dimensional Heisenberg group holonomy. *Differential Geom. Appl.* **33** (2014), 81–111.
arXiv:1302.7163
- [11] C.R. Graham, T. Willse, Subtleties Concerning Conformal Tractor Bundles. *Cent. Eur. J. Math.* **10** (2012), 1721–1732.
arXiv:1201.2670
- [12] C.R. Graham, T. Willse, Parallel Tractor Extension and Ambient Metrics of Holonomy Split G_2 . *J. Differential Geom.*, **92** (2012), 463–506.
arXiv:1109.3504

RESEARCH
SUPPORT

Mathematical Sciences Research Visitor Program grant to provide support for overseas visitor (Matthias Hammerl) to visit for research collaboration (2015)

Mathematical Sciences Research Visitor Program grant to provide support for overseas visitor (A. Rod Gover) to visit for research collaboration (2014)

INVITED VISITS

University of Tromsø, Tromsø, Norway, June 2018, Boris Kruglikov and Dennis The

University of Auckland, September 2013, January 2015, July 2017, and November 2019, A. Rod Gover

Ernst-Moritz-Arndt-Universität Greifswald, Greifswald, Germany, June 2014, November 2015, and October 2016, Matthias Hammerl

Instituto Superior Técnico, Lisbon, Portugal, August 2013 and June 2014, John Huerta

Friedrich-Schiller-Universität Jena, Jena, Germany, April 2013 and August 2013, Vladimir Matveev

Utah State University, Logan, U.S.A., March 2012, Ian Anderson

Erwin Schrödinger Institute, Vienna, Austria, April–June 2011

INVITED TALKS

*A missing distribution and a metric of holonomy G_2^** , Ernst-Moritz-Arndt-Universität Greifswald, October 2016

Generic distributions and Einstein geometry (Colloquium), Ernst-Moritz-Arndt-Universität Greifswald, November 2015

Holography for parallel conformal data, Instituto Superior Técnico, June 2014

G_2 and some exceptional geometric structures via projective geometry, Ernst-Moritz-Arndt-Universität Greifswald, June 2014

Doubrov and Govorov's exceptional $(2, 3, 5)$ -distribution and an explicit ambient metric of (split) G_2 holonomy, University of Auckland September 2013

Groups of type G_2 and exceptional geometric structures in dimensions 5, 6, and 7, Instituto Superior Técnico, August 2013

Tractors in projective geometry and the group G_2 , Friedrich-Schiller-Universität Jena, April 2013

CONFERENCE TALKS

Chains of path geometries on surfaces (invited), University of Washington, Seattle, U.S.A., June 2022

Sasaki-Einstein metrics and their compactifications via projective geometry, Srní, Czech Republic, January 2018

Almost Einstein $(2, 3, 5)$ conformal structures, Srní, Czech Republic, January 2017

Holography of (2, 3, 5)-distributions and nearly Kähler geometry, Banach Center, Warsaw, Poland, June 2014

Groups of type G_2 and exceptional geometric structures in dimensions 5, 6, and 7, University of Sydney, Sydney, Australia, September 2013

Doubrov and Govorov's exceptional (2,3,5)-distribution and explicit ambient metric of (split) G_2 holonomy, University of Sydney, Sydney, Australia, September 2013

Generic plane fields and special holonomy, International Erwin Schrödinger Institute, Vienna, Austria, September 2012

Nurowski's conformal structures and highly symmetric 2-plane fields on 5-manifolds, University of Tromsø, Tromsø, Norway, August 2012

Highly symmetric generic 2-plane fields on 5-manifolds and Heisenberg 5-group holonomy, Banff International Research Station, Banff, Canada, August 2012

Generic 2-plane fields on 5-manifolds and constructing metrics of holonomy G_2 , Utah State University, Logan, U.S.A., March 2012

Nurowski conformal classes and the conformal tractor and ambient constructions (series of 2), Utah State University, Logan, U.S.A. March 2012

The exceptional geometry of 2-plane fields on 5-manifolds, CES + AmeGA Workshop, Radejov, Czech Republic, May 2011

Parallel tractor extension, University of Arkansas, Fayetteville, U.S.A., April 2011

CONFERENCES
(SELECTED)

Conformal Geometry, Analysis, and Physics (invited speaker), Seattle, U.S.A., June 2022

38th Winter School Geometry and Physics, Srní, Czech Republic, January 2018

Symmetry and Geometric Structures, Warsaw, Poland, November 2017

Workshop on Geometry of Lagrangian Grassmannians and nonlinear PDEs, Warsaw, Poland, September 2016

Differential Geometry and its Applications, Brno, Czech Republic, July 2016

Eduard Čech Institute Workshop, Třešť, Czech Republic, October 2015

Vector Distributions and Related Geometries, Banach Center, Warsaw, Poland, June 2014

C-projective Geometry, The Australian National University, Kioloa, Australia, March 2014

57th Annual Meeting of the Australian Mathematical Society, University of Sydney, Sydney, Australia, September 2013

Differential Geometry and its Applications, Brno, Czech Republic, July 2013

New Directions in Exterior Differential Systems, Estes Park, U.S.A., July 2013

The Interaction of Geometry and Representation Theory, International Erwin Schrödinger Institute, Vienna, Austria, September 2012

Geometry and Algebra of PDEs, University of Tromsø, Tromsø, Norway, August 2012

Conformal and CR geometry (12w5072), Banff International Research Station, Banff, Canada, July 2012

Differential Geometry of Distributions, University of Utah, Logan, U.S.A., March 2012

The Geometry of Differential Equations, The Australian National University, Canberra, Australia, September 2011

CES + AmeGA Workshop, Radejov, Czech Republic, May 2011

Conformal Differential Geometry and its Interaction with Representation Theory, University of Arkansas, Fayetteville, U.S.A., April 2011

Pacific Northwest Geometry Seminar, University of Oregon, Eugene, U.S.A., October 2010

DEPARTMENTAL
TALKS
(SELECTED)

The ambient metric and applications to holonomy (series of 2), March 2019

Invariant differential operators in CR geometry (series of 3), University of Vienna, November 2018

Curved orbit decompositions and the ambient metric construction, Banach Center, Institute of Mathematics, Polish Academy of Sciences, October 2017

Doubrov and Govorov's exceptional (2, 3, 5)-distribution, The Australian National University, July 2013

Generic 2-plane fields on 5-manifolds, parallel tractor extension, and split G_2 metric holonomy, The Australian National University, November 2012

TEACHING
EXPERIENCE

Guilford College, Greensboro, U.S.A.

Visiting assistant professor

2021 to present

College Algebra (spring 2023)

Mathematics for the Liberal Arts (fall 2021, fall 2022)

Introductory Statistics (fall 2021, spring 2022, fall 2022)
 Discrete Mathematics (fall 2022)
 Calculus I (fall 2022)
 Calculus II (spring 2023)
 Calculus IV (spring 2022)
 Introductory to Data Science (spring 2022)
 Mathematics of Games (spring 2023)
 Complex Analysis (spring 2023)

Lewis & Clark College, Portland (Oregon), U.S.A.

Visiting assistant professor **2020 to 2021**

Calculus I (fall 2020, spring 2021)
 Perspectives in Statistics (spring 2021)

The Australian National University, Canberra, Australia

Postdoctoral research fellow **2012 to 2015**

Differential Geometry (first semesters of 2012, 2013, 2015)
 Ph.B. reading courses (Cartan geometry, Riemannian geometry, symplectic geometry) (2012–2015)

STUDENT
ADVISING

The Australian National University, Canberra, A.C.T., Australia

- Emma Howard, Pre-honours Ph.B. Advanced Studies Course (2012)

SEMINARS
ORGANIZED

Differential Geometry Seminar, Differential Geometry Working Seminar, The Australian National University, 2012–2015

SERVICE TO
PROFESSION

Referee Service

Analysis and Mathematical Physics
 Canadian Journal of Mathematics
 Central European Journal of Mathematics
 Differential Geometry and its Applications
 Journal of Differential Geometry
 The Journal of Geometric Analysis
 Proceedings of the London Mathematical Society
 Symmetry, Integrability and Geometry: Methods and Applications

Review Service

Mathematical Reviews