

# Casey Blacker

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## Personal information

date of birth	19 September 1990
nationality	USA
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webpage	<a href="http://math.gmu.edu/~cblacke">http://math.gmu.edu/~cblacke</a>
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## Research interests

moment maps, Lie groupoids, higher geometry, and bundle gerbes

## Employment

2023 – 2025	<b>Postdoctoral Research Fellow, George Mason University</b>
2020 – 2022	EIMI International Postdoc, Saint Petersburg State University
2018 – 2020	CPSF International Exchange Postdoc, East China Normal University

## Education

2018	PhD, University of California, Santa Barbara <i>with</i> Certificate in College and University Teaching <i>advised by</i> Xianzhe Dai
2015	MA, University of California, Santa Barbara
2013	Master of Mathematics (Pure Mathematics, Fast-Track), University of St Andrews undergraduate degree, First Class Honours

## Papers and preprints

1. Reduction of  $L_\infty$ -algebras of observables on multisymplectic manifolds (with A. Miti and L. Ryvkin). *SIMGA* 20, 061, 2024
2. Reduction of multisymplectic manifolds. *Lett. Math. Phys.*, 111(3):Paper No. 64, 30, 2021
3. Quantization of polysymplectic manifolds. *J. Geom. Phys.*, 145:103480, 2019
4. Polysymplectic reduction and the moduli space of flat connections. *J. Phys. A*, 52(33):335201, 2019
5. First eigenvalue of the  $p$ -Laplacian on Kähler manifolds (with S. Seto). *Proc. Amer. Math. Soc.*, 147(5):2197-2206, 2019
6. *The Moduli Space of Flat Connections over Higher Dimensional Manifolds*. ProQuest LLC, Ann Arbor, MI, 2018. Thesis (Ph.D.)—University of California, Santa Barbara

## Lecture notes

1. Introduction to Symplectic Geometry  
<https://math.gmu.edu/~cblacke/teaching.html>

## Conference proceedings

1. Algebraic and geometric reduction of multisymplectic manifold. *J. Phys. Conf. Ser.* (Contribution to QTS12) 2667 1, 2023

## Invited talks

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|-------|--|
| 6/24  | <i>Summer Meeting of the Canadian Mathematical Society</i> ,<br>Special Session on Symplectic and Poisson Geometry, University of Saskatchewan |
| 11/23 | <i>PIMS Geometry, Algebra and Physics Seminar</i> , University of Saskatchewan   |
| 11/23 | <i>Mathematics Department Colloquium</i> , University of Manitoba  |
| 7/23  | <i>XII. International Symposium on Quantum Theory and Symmetries</i> , Czech Technical University  |
| 12/23 | <i>Seminarium Theory of Duality</i> , University of Warsaw   |
| 4/22  | <i>Weekly Departmental Seminar</i> , Tbilisi State University  |
| 12/21 | <i>Young Scientists' Congress</i> , Russian Year of Science and Technology, Sochi  |
| 7/21  | <i>Singular Foliations and Related Structures</i> , Virtual Seminar  |
| 11/20 | <i>Geometry and Combinatorics Seminar</i> , Chebyshev Lab, St Petersburg   |
| 9/20  | <i>Workshop on Multisymplectic Geometry</i> , KU Leuven  |
| 12/19 | <i>Super-Riemann Surfaces and Related Topics</i> , University of Tokyo   |
| 11/19 | <i>Workshop on Differential Geometry</i> , Tongji University   |
| 7/19  | <i>Oberseminar Geometrie, Topologie und Analysis</i> , University of Cologne   |
| 12/18 | <i>Postdoc Seminar</i> , NYU-Shanghai  |
| 5/18  | <i>MathConnections 2018</i> , University of California, Riverside  |
| 1/18  | <i>Joint Mathematics Meetings of the American Mathematical Society</i><br>and the Mathematical Association of America                          |

## Honors and awards

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|-------------|--|
| 9/18 – 9/20 | China Postdoctoral Science Foundation (CPSF) International Exchange Fellowship |
| 11/14       | Academic Senate Outstanding Teaching Assistant Award Nominee                   |
| 9/13 – 9/17 | NSF PhD Fellowship with Research Training Group in Geometry–Topology           |

## Conferences organized

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|------|---|
| 1/24 | Workshop on Multisymplectic Structures in Geometry and Physics<br><a href="https://math.gmu.edu/~cblacke/lyon.html">https://math.gmu.edu/~cblacke/lyon.html</a>                       |
| 7/21 | <i>Young Researchers' Virtual Multisymplectic Geometry Conference 2021</i><br><a href="https://math.gmu.edu/~cblacke/yrvmgc_21.html">https://math.gmu.edu/~cblacke/yrvmgc_21.html</a> |
| 7/20 | <i>Young Researchers' Virtual Multisymplectic Geometry Conference 2020</i><br><a href="https://math.gmu.edu/~cblacke/yrvmgc_20.html">https://math.gmu.edu/~cblacke/yrvmgc_20.html</a> |

## Seminars organized

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|-------------|--|
| 5/24 – 6/24 | String Theory Learning Seminar<br><a href="https://math.gmu.edu/~cblacke/strings.html">https://math.gmu.edu/~cblacke/strings.html</a>                |
| 9/21 – 1/22 | SPbU Young Researchers' Seminar<br><a href="https://indico.eimi.ru/category/57/">https://indico.eimi.ru/category/57/</a>                             |
| 4–6/21      | Generalized Complex Geometry Learning Seminar<br><a href="https://math.gmu.edu/~cblacke/seminar.html">https://math.gmu.edu/~cblacke/seminar.html</a> |
| 10–11/20    | Virtual Postdoc Seminar  |

Each of the following seminars is centered around a text:

3–6/17	Classical Mechanics Learning Seminar* <i>Lectures on Mechanics</i> , by J. Marsden
1/17	Graduate Geometry Seminar* <i>A Mathematical Introduction to Conformal Field Theory</i> , by M. Schottenloher
8–12/15	Graduate Geometry Seminar* <i>Methods of Classical Mechanics</i> , by V.I. Arnold
10–12/14	Graduate Geometry Seminar <i>Characteristic Classes</i> , by J. Milnor and J. Stasheff

\* in collaboration with the Department of Physics

### Academic visits

7/19	University of Cologne, <i>host</i> : George Marinescu
4/22	Iliia State University, Tbilisi, <i>host</i> : Giorgi Khimshiashvili
11/22	Gebze Technical University, Istanbul, <i>host</i> : Oğul Esen
11/23	University of Manitoba, <i>host</i> : Derek Krepski
11/23	University of Saskatchewan, <i>host</i> : Steven Ryan
12/24	Université Claude Bernard Lyon 1, <i>host</i> : Leonid Ryvkin

### Mentored publications

1. | Logarithmic spirals on surfaces of constant Gaussian curvature (with P. Tsyganenko), May 2023. arXiv:2305.19919

### Service

6/24	Judge for GMU College of Science Undergraduate Research Colloquium
4/24	Proctor and grader for GMU Math Dept. Calculus Olympiad
11/21 –	Grant reviewer for the National Sciences and Engineering Research Council of Canada
9/21 – 2/22	Volunteer mentor at Saint Petersburg public high school No. 564 Taught an evening course with material adapted from <i>Differential Geometry of Curves and Surfaces</i> , by M. do Carmo, culminating in two student research projects: <ol style="list-style-type: none"><li>1. <i>Generalized loxodromes on surfaces of constant Gaussian curvature</i>, Pavel Tsyganenko</li><li>2. <i>Geodesics on surfaces of revolution with convex profile curve</i>, Alexander Travin</li></ol> each presented at the Baltiyskiy Science Fair ( <a href="https://baltkonkurs.ru">https://baltkonkurs.ru</a> ).
8/19 –	Reviewer for <i>SIGMA</i>

## Teaching

8-12/24	Functions of a Complex Variable
6-7/24	Analytic Geometry and Calculus III
1-5/24	Geometry
8-12/23	Probability
9-12/21	Symplectic Geometry*
2-6/20	Symplectic Geometry*
6-7/18	Multivariable Calculus II
8-9/17	Multivariable Calculus I
8-9/16	Differential Equations
6-7/15	Calculus for the Social and Life Sciences

\* indicates a graduate course

## Teaching assistantships

4-6/18	Multivariable Calculus II
1-3/18	Multivariable Calculus II
9-12/17	Introduction to Higher Mathematics
9-12/16	Calculus I
9-12/15	Linear Algebra
9-12/14	Introduction to Higher Mathematics
9-12/13	Calculus for the Social and Life Sciences