

# Peter R. Merkk

Email: pmerkk (AT) gmail.com

## PROFESSIONAL EXPERIENCE

- 2022-2024: Visiting Assistant Professor, Department of Mathematics, Wake Forest University
- 2020-2021: Senior Researcher, Center for Theoretical Physics of the Universe, Institute for Basic Science, South Korea
- 2019-2020: Lecturer, Department of Mathematics, University of California, Davis
- 2018-2019: Visiting Assistant Professor of Mathematics, Department of Mathematics and Computer Science, Wesleyan University
- 2017-2018: Continued research with mentor David R. Morrison in the Department of Mathematics, University of California, Santa Barbara
- 2011-2017: Instructor / Teaching Assistant, Department of Mathematics, University of California, Santa Barbara
- 2008-2010: Mathematics Tutor with MathIsMagic, Eugene, Oregon
- 2006-2008: Instructor / Graduate Teaching Associate, Department of Mathematics, University of Oregon

## EDUCATION

- Ph.D. in Mathematics, University of California Santa Barbara, 2017
- M.S. in Mathematics, University of Oregon, 2008
- B.S. in Mathematics, Duke University, 2006

## RESEARCH INTERESTS

- Algebraic Geometry, Mathematics of String Theory, F-Theory, Calabi-Yau Manifolds & Varieties, Low-Dimensional Topology, Finite Group Theory, Graph Theory, Complex Geometry

## PUBLICATIONS

- *Pairing 6D SCFTs*, (2019)  
arXiv:1903.00079 [hep-th]. <https://arxiv.org/abs/1903.00079>
- *Classifying global symmetries of 6D SCFTs*, J. High Energy Phys. 03 (2018) 163.  
arXiv:1711.05155 [hep-th]. <https://arxiv.org/abs/1711.05155>  
Published version: <https://peterrmerkk.com/ClassifyingGS.pdf>
- *Global symmetries of six dimensional superconformal field theories*, University of California, Santa Barbara Doctoral Thesis, 2017.  
[https://peterrmerkk.com/Thesis\\_Abridged\\_Version\\_Nov\\_2017.pdf](https://peterrmerkk.com/Thesis_Abridged_Version_Nov_2017.pdf)
- (with M. Bertolini and D. R. Morrison) *On the global symmetries of 6D superconformal field theories*, J. High Energy Phys. 07 (2016) 005.  
arXiv:1510.08056 [hep-th]. <https://arxiv.org/abs/1510.08056>

## PUBLICATIONS IN PREPARATION

- *On Classifying Compact Calabi-Yau Threefolds*
- *Geometrizing the Frozen Phase of F-Theory*

## TALKS

- *Algebraic Geometry and Dimensional Reductions in String Theory* (short talk geared towards building undergraduate interest in mathematics research; event hosted by local chapter of Association for Women in Mathematics); Department of Mathematics, Wake Forest University (November 13, 2023)
- *Classifying bases for 6D F-theory models* (review of work by Morrison & Taylor); Journal Club, Institute for Basic Science, May 22, 2021
- *Paring 6D SCFTs*; Gong Show II in The 15th Kavli Asian Winter School on Strings, Particles and Cosmology, January 22, 2021
- *Orbifold and SCFT pairs*; Welcome Workshop, Institute for Basic Science, November 24, 2020
- *Fine and coarse structures in the SCFT landscape*, Dark World to Swampland, The 5th IBS-IFT-MultiDark Workshop, October 15, 2020
- *F-theory and a duality in the string landscape*; Quantum Moduli and Physics Seminar, Department of Mathematics, University of California, Davis; October 11, 2019
- *Some exceptional graphs and their symmetries*; Wesleyan Mathclub, Department of Mathematics and Computer Science, Wesleyan University; May 9, 2019
- *Global symmetries of superconformal quantum field theories*; Mathematics Colloquium, Department of Mathematics and Computer Science, Wesleyan University; December 6, 2018
- *Algebraic geometry and the string landscape*; for Duke Kunshan University Natural Science Division (at Duke University); May 24, 2018

## HONORS

- Graduate Student Research Appointment under David R. Morrison (Supported in part by NSF grant PHY-1307513), Department of Mathematics, University of California, Santa Barbara
- Graduate Teaching Fellowship, University of California, Santa Barbara
- Graduate Teaching Fellowship, University of Oregon
- *Summa cum laude*, Duke University
- Phi-Beta-Kappa, Duke University
- Student Marshall, Duke University
- VIGRE-PRUV Undergraduate Research Fellowship in Mathematics, Duke University

## TEACHING

- Calculus and Analytic Geometry I, (Spring 2024, 3 Sections, 105 Students), Wake Forest University
- Calculus and Analytic Geometry I, (Fall 2023, 3 Sections, 75 Students), Wake Forest University
- Calculus and Analytic Geometry III, (Spring 2023, 24 Students), Wake Forest University
- Calculus and Analytic Geometry I, (Spring 2023, 2 Sections, 50 Students), Wake Forest University
- Calculus and Analytic Geometry II, (Fall 2022, 3 Sections, 70 Students), Wake Forest University
- Short Calculus, Part II (Spring '20, 180 students; fully online due to pandemic), University of California, Davis
- Precalculus (Winter '20, 175 students; partially online due to pandemic), University of California, Davis
- Vector Analysis (Winter '20, 95 students; partially online due to pandemic), University of California, Davis
- Calculus for Biology and Medicine I (Fall '19, 275 students), University of California, Davis
- Calculus I, Part II (Spring '19; 2 sections) Wesleyan University

- Discrete Mathematics (Spring '19) Wesleyan University
- Calculus I, Part I (Fall '18), Wesleyan University
- Multivariable Calculus (Fall '18), Wesleyan University
- Calculus with Applications I (Spring '15), University of California, Santa Barbara
- Teaching Assistant Discussion Section Leader at UCSB ('11-'17): Linear Algebra (9 sections), Calculus I (7 sections), Calculus I & II for STEM (8 sections), Differential Equations (26 sections), Partial Differential Equations (13 sections)
- University Mathematics II (Summer '07), University of Oregon
- College Algebra (Fall '06, '07, Winter '07, Spring '08), University of Oregon

## RESEARCH STUDENTS

- Chuanyang Yu. 2023 MS Mathematics Thesis co-supervisor with Sarah Raynor, Wake Forest University
- Morgan Long. 2019 Wesleyan Undergraduate Summer Research in Mathematics program (in graph theory and mathematical physics) co-supervising with Karen Collins.
- Isabelle Coughlin and Jackson Odum, Independent study on algebraic geometry and F-theory (Spring 2024)

## CONFERENCES/WORKSHOPS ATTENDED

- F-Theory Workshop, 2019, Florida State University
- ICERM Real Algebraic Geometry and Optimization 2018, Brown University
- Strings 2016, (YSMC) Tsinghua University
- F-Theory at 20 (2016), Burke Institute, Caltech
- 21st Southern California Geometric Analysis Seminar 2014 at UCI
- 20th Southern California Geometric Analysis Seminar 2013 at UCSD

## MISCELLANEOUS

- Reviewer for zbMATH (January 2018-present)
- Programming: Mathematica, Java, C/C++, Matlab, GAP, and others

## REFERENCES:

- David R. Morrison, University of California, Santa Barbara, Department of Mathematics, Department of Physics.  
email: drm AT math.ucsb.edu  
phone: 805-893-8309
- Daryl Cooper, University of California, Santa Barbara, Department of Mathematics.  
email: cooper AT math.ucsb.edu  
phone: 805-893-8424
- Mihai Putinar, University of California, Santa Barbara, Department of Mathematics.  
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phone: 805-893-3252
- Adam Fieldsteel, Wesleyan University, Department of Mathematics and Computer Science (Teaching Reference)  
email: afieldsteel AT wesleyan.edu  
phone: 860-685-2189
- Ali A. Dad-del, University of California, Davis, Department of Mathematics (Teaching Reference)  
email: daddel AT math.ucdavis.edu  
phone: 530-754-0324

**PERSONAL**

- Citizenship: U.S.A.