

RYAN W. MATZKE

ADDRESS: Vanderbilt University, Department of Mathematics, 1503 Stevenson Center, Nashville, TN 37240

EMAIL: ryan.w.matzke@vanderbilt.edu

WEBSITE: <https://www.ryanmatzke.com/>

EDUCATION

Ph.D. in MATHEMATICS, **University of Minnesota** May 2021

Advisor: Professor Dmitriy Bilyk

Thesis: Problems with a lot of Potential: Energy Optimization on Compact Spaces

https://www.ryanmatzke.com/pdfs/Ryan_William_Matzke_Dissertation.pdf

M.S. in MATHEMATICS, **University of Minnesota** April 2019

B.A. in MATHEMATICS, **Gettysburg College** May 2015

Minor: Physics

Magna Cum Laude, Honors in Mathematics, Honors in Physics

Spring 2014 Budapest Semester in Mathematics

APPOINTMENTS

NSF Postdoctoral Fellow August 2022 - Present

Department of Mathematics, Vanderbilt University

Mentor: Professor Edward Saff

Postdoctoral Researcher June 2021 - August 2022

Institute of Analysis and Number Theory, Technische Universität Graz

Mentor: Professor Peter Grabner

RESEARCH INTERESTS

My main research interests are Potential Theory and Energy Optimization, as well as their connections and applications to Approximation Theory, Differential Equations, Frame Theory, and various other areas. I also have interest in Analysis (particularly Harmonic Analysis and Discrepancy Theory), Geometry (in particular Discrete and Convex Geometries), and Combinatorics (in particular Additive Combinatorics and Graph Theory).

GRANTS, FELLOWSHIPS, AND AWARDS

NSF MATHEMATICAL SCIENCES POSTDOCTORAL RESEARCH FELLOWSHIP 8/2022-8/2025

National Science Foundation

ALEXANDERSON AWARD 2025

American Institute of Mathematics - Awarded for the paper

Energy on Spheres and Discreteness of Minimizing Measures

DOCTORAL DISSERTATION FELLOWSHIP 9/2020-5/2021

University of Minnesota - This fellowship is awarded to less than 15% of all Ph.D. students

entering their final year of study at the University of Minnesota.

NSF GRADUATE RESEARCH FELLOWSHIP 2016-2019

National Science Foundation

COLLABORATE@ICERM “Codes and Designs: Optimal Discrete Measures” 8/9/2021-8/13/2021

Joint with Dmitriy Bilyk, Damir Ferizović, Alexey Glazyrin, Josiah Park, and Oleksandr Vlasiuk

ICERM

AMS GRADUATE STUDENT TRAVEL GRANT Spring 2020

AMS

COGS STUDENT TRAVEL GRANT Summer 2019

UMN Council of Graduate Students

GOLDWATER SCHOLARSHIP Barry Goldwater Scholarship Foundation	2014
J. ROGERS MUSSELMAN AWARD Gettysburg College Math Dept.	2014
BAUM MATHEMATICAL PRIZE Gettysburg College Math Dept.	2013
MALCOLM R. DOUGHERTY MATHEMATICAL AWARD Gettysburg College Math Dept.	2012
RUFUS M. WEAVER MATHEMATICAL SCHOLARSHIP Gettysburg College	2012-2014
PRESIDENTIAL SCHOLARSHIP Gettysburg College	2011-2015

PUBLICATIONS

Published/Accepted

1. Minimizers for an Aggregation Model with Attractive-repulsive Interaction (with Rupert L. Frank). Accepted to *Archive for Rational Mechanics and Analysis*. ArXiv:[2307.13769](https://arxiv.org/abs/2307.13769).
2. Optimal Measures for Multivariate Geometric Potentials (with Dmitriy Bilyk, Damir Ferizović, Alexey Glazyrin, Josiah Park, and Oleksandr Vlasniuk). Accepted to the *Indiana University Mathematics Journal*. ArXiv:[2303.14258](https://arxiv.org/abs/2303.14258).
3. Optimizers of Three-point Energies and Nearly Orthogonal Sets (with Dmitriy Bilyk, Damir Ferizović, Alexey Glazyrin, Josiah Park, and Oleksandr Vlasniuk). *Proceedings of the American Mathematical Society*, **152**, 4015-4033 (2024). doi: [10.1090/proc/16868](https://doi.org/10.1090/proc/16868) ArXiv:[2303.12283](https://arxiv.org/abs/2303.12283).
4. Riesz Energy, L^2 Discrepancy, and Optimal Transport of Determinantal Point Processes on the Sphere and the Flat Torus (with Bence Borda and Peter Grabner). *Mathematika*, **70**(2), e12245 (2024). doi: [10.1112/mtk.12245](https://doi.org/10.1112/mtk.12245), ArXiv:[2308.06216](https://arxiv.org/abs/2308.06216).
5. Experimental Survey of Discrete Minimizers of the p -frame Energy (with Dmitriy Bilyk, Alexey Glazyrin, Josiah Park, 2023 57th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 522-529 (2023). doi:[10.1109/IEEECONF59524.2023.10476892](https://doi.org/10.1109/IEEECONF59524.2023.10476892)
6. Riesz and Green Energy on Projective Spaces (with Austin Anderson, Maria Dostert, Peter J. Grabner, and Tetiana A. Stepaniuk). *Transactions of the American Mathematical Society, Series B*, **10**, 1039-1076 (2023). doi: [10.1090/btran/161](https://doi.org/10.1090/btran/161), ArXiv:[2204.04015](https://arxiv.org/abs/2204.04015)
7. Positive Definiteness and the Stolarsky Invariance Principle (with Dmitriy Bilyk and Oleksandr Vlasniuk). *Journal of Mathematical Analysis and Applications*, **513**(2), 126220 (2022). doi: [10.1016/j.jmaa.2022.126220](https://doi.org/10.1016/j.jmaa.2022.126220), ArXiv:[2110.04138](https://arxiv.org/abs/2110.04138)
8. Potential Theory with Multivariate Kernels (with Dmitriy Bilyk, Damir Ferizović, Alexey Glazyrin, Josiah Park, and Oleksandr Vlasniuk). *Math Zeitschrift*, **301**, 2907-2935 (2022). doi: [10.1007/s00209-022-03000-z](https://doi.org/10.1007/s00209-022-03000-z), ArXiv:[2104.03410](https://arxiv.org/abs/2104.03410).
9. Optimal Measures for p -frame Energies on Spheres (with Dmitriy Bilyk, Alexey Glazyrin, Josiah Park, and Oleksandr Vlasniuk). *Revista Matemática Iberoamericana*, **38**(4), 1129-1160 (2022). doi: [10.4171/rmi/1329](https://doi.org/10.4171/rmi/1329), ArXiv:[1908.00885](https://arxiv.org/abs/1908.00885)
10. Energy on Spheres and Discreteness of Minimizing Measures (with Dmitriy Bilyk, Alexey Glazyrin, Josiah Park, Oleksandr Vlasniuk). *Journal of Functional Analysis*, **280**(11), 108995 (2021). doi: [10.1016/j.jfa.2021.108995](https://doi.org/10.1016/j.jfa.2021.108995), ArXiv:[1908.10354](https://arxiv.org/abs/1908.10354).
11. On Subgraphs with Prescribed Eccentricities (with Peter Dankelmann, Matthew DeVilbiss, David Erwin, and Kelly Guest). *Discussiones Mathematicae Graph Theory*, **43**(3), 685–702 (2023); published electronically (2021). doi: [10.7151/dmgt.2396](https://doi.org/10.7151/dmgt.2396)
12. On the Fejes Tóth Problem about the Sum of Angles Between Lines (with Dmitriy Bilyk). *Proceedings of the AMS*, **147**(1), 51-59 (2019). doi:[10.1090/proc/14263](https://doi.org/10.1090/proc/14263), ArXiv:[1801.07837](https://arxiv.org/abs/1801.07837)
13. The Maximum Size of (k, l) -Sum-Free Sets in Finite Cyclic Groups (with Béla Bajnok). *Bulletin of the Australian Mathematical Society*, **99**(2), 184-194 (2019). doi:[10.1017/S000497271800117X](https://doi.org/10.1017/S000497271800117X), ArXiv:[1809.01767](https://arxiv.org/abs/1809.01767)
14. The Edge Grundy Number of the Regular Turan Graphs (with Matthew DeVilbiss and Peter Johnson). *Bulletin of the Institute of Combinatorics and its Applications*, **84**, 45-52 (2018). <http://luca-giuzzi.unibs.it/ICA/Volumes/84/Reprints/BICA2018-02-Main-Reprint.pdf>

15. Rainbow Connectivity in some Cayley Graphs (with Sheng Bau, Peter Johnson, Edna Jones, and Khumbo Kumwenda). *The Australasian Journal of Combinatorics*, **71**(3), 381-393 (2018). https://ajc.maths.uq.edu.au/pdf/71/ajc_v71_p381.pdf
16. Stolarsky Principle and Energy Optimization on the Sphere (with Dmitriy Bilyk and Feng Dai). *Constructive Approximation*, **48**(1), 31-60 (2018). doi:10.1007/s00365-017-9412-4, ArXiv:1611.04420
17. Connected Minimum Secure Dominating Sets in Grids (with Johnathan Barnett, Adam Blumenthal, Peter Johnson, Cadavious Jones, and Egbert Mujuni). *AKCE International Journal of Graphs and Combinatorics*, **14**(3), 216-223 (2017). doi:10.1016/j.akcej.2017.03.003
18. The Edge Grundy Number of some Graphs (with Loren Anderson, Matthew DeVilbiss, Sarah Holliday, Peter Johnson, Anna Kite, and Jessica McDonald). *International Journal of Mathematics and Computer Science*, **12**(1), 13-26 (2017). <http://ijmcs.future-in-tech.net/12.1/R-EdgeGrundyNumbers.pdf>
19. On the Minimum Size of Signed Sumsets in Elementary Abelian Groups (with Béla Bajnok). *The Journal of Number Theory*, **159**, 384 - 401 (2016). doi:10.1016/j.jnt.2015.07.023, ArXiv:1412.1609
20. The Minimum Size of Signed Sumsets (with Béla Bajnok). *The Electronic Journal of Combinatorics*, **22**(2), P2.50 (2015). doi:10.37236/4881, ArXiv:1412.1608
21. Note on the Secure-Domination Number of a Graph (with Matthew DeVilbiss, Bradley Fain, and Peter Johnson). *Bulletin of the Institute of Combinatorics and its Applications*, **74**, 113-119 (2015).
22. Appendix to “Maximizing Expected Powers of the Angle between Pairs of Points in Projective Space” by Tongseok Lim and Robert McCann (with Dmitriy Bilyk, Alexey Glazyrin, Josiah Park, and Oleksandr Vlasiuk). *Probability Theory and Related Fields*, **184**, 1197-1214 (2022). doi:10.1007/s00440-022-01108-1, ArXiv:2007.13052.

Submitted

1. Geodesic Distance Riesz Energy on Projective Spaces (with Dmitriy Bilyk and Joel Nathe). ArXiv:2409.16508
2. Riesz Energy with a Radial External Field: When is the Equilibrium Support a Sphere? (with Djalil Chafaï, Edward B. Saff, Minh Quan H. Vu, and Robert S. Womersley). ArXiv:2405.00120
3. A Random Line Intersects S^2 in Two Probabilistically Independent Locations (with Dmitriy Bilyk, Alan Chang, Otte Heinävaara, and Stefan Steinerberger). ArXiv:2307.04314.
4. Babai Numbers and Babai Spectra of Paths and Cycles (with Peter Johnson and Celalettin Kaya). ArXiv:2409.04869.

PRESENTATIONS

Invited Talks

RIESZ ENERGY WITH AN EXTERNAL FIELD: DIMENSIONALITY OF MINIMIZERS Midwestern Workshop on Asymptotic Analysis	10/13/2024 Indiana University - Bloomington, Bloomington, IN
USING RANDOM LINES TO IDENTIFY S^2 AMS 2024 Fall Southeastern Sectional Meeting Special Session on Convexity, Probability, and Asymptotic Geometric Analysis (*Cancelled due to hurricane Helene)	10/5/2024 Georgia Southern University - Armstrong Campus Savannah, GA
RIESZ ENERGY WITH AN EXTERNAL FIELD: WHEN IS THE MINIMIZER A SPHERE? Special Session on Point Configurations: Energy, Designs, and Discrepancy 2nd AMS-UMI International Joint Meeting	7/26/2024 Università degli Studi di Palermo Palermo, Italy
MINIMIZERS OF ENERGIES WITH REPULSIVE-ATTRACTIVE POWER LAW INTERACTIONS Special Session on Geometric Variational Models with Nonlocal Energies 2nd AMS-UMI International Joint Meeting	7/24/2024 Università degli Studi di Palermo Palermo, Italy
SURFACE LEVEL REPULSION: GEODESIC RIESZ ENERGY ON SPHERES AND PROJECTIVE SPACES Analysis Seminar	7/17/2024 LMU, Munich Germany
GEODESIC RIESZ ENERGY ON PROJECTIVE SPACES Workshop on Recent Progress on Optimal Point Distributions and Related Fields	June 2024 ICERM, Providence, RI

MULTIVARIATE GEOMETRIC POTENTIALS AND OPTIMALITY OF THE REGULAR SIMPLEX AMS 2023 Fall Southeastern Sectional Meeting Special Session on Discrete Geometry and Geometric Optimization	10/13/2023 University of South Alabama Mobile, AL
ENERGY AND DISCREPANCY ON HAMMING SPACES 2023 AWM Research Symposium	9/30/2023 Clark Atlanta University, Atlanta, GA
MINIMIZERS OF ENERGIES WITH REPULSIVE-ATTRACTIVE INTERACTIONS International Conference on Approximation and Potential Theory	9/23/2023 Georgia Southern University, Savannah, GA
ENERGY OPTIMIZATION FOR M-PARTICLE INTERACTIONS ON THE SPHERE Barcelona Analysis Seminar	6/29/2023 Universitat Politècnica de Catalunya, Barcelona, Spain
GREEDY SEQUENCES ON THE SPHERE Guest Lecture	6/26/2023 Universität Innsbruck, Innsbruck, Austria
ENERGY, DISCREPANCY, AND POLARIZATION OF GREEDY SEQUENCES ON THE SPHERE Research Seminar Numerical Analysis of Stochastic and Deterministic Partial Differential Equations	6/16/2023 FU Berlin, Berlin, Germany
RIESZ ENERGY WITH EXTERNAL FIELDS Classical Analysis Seminar	6/12/2023 KU Leuven, Leuven, Belgium
ENERGY, DISCREPANCY, AND POLARIZATION OF GREEDY SEQUENCES ON THE SPHERE Zahlentheoretisches Kolloquium	6/7/2023 TU Graz, Graz, Austria
ENERGY OPTIMIZATION FOR K-PARTICLE INTERACTIONS ON THE SPHERE Rainwater Seminar	4/11/2023 University of Washington, Seattle, WA
ENERGY OPTIMIZATION WITH MULTIVARIATE KERNELS Mathematisches Kolloquium	5/31/2021 TU Graz, Graz, Austria
ENERGY OPTIMIZATION WITH MULTIVARIATE KERNELS Friday Analysis & Applied Math Seminar	4/30/2021 (online) University of Toronto, Toronto, Canada
ENERGY OPTIMIZATION WITH MULTIVARIATE KERNELS II Geometry, Analysis and Applications (GAiA) Masters School	1/27/2021 (online) CIEM, Spain
MINIMIZATION OF MULTIVARIATE ENERGY 2020 Shenks Conference *Cancelled due to COVID-19	May 2020 Vanderbilt University
GENERALIZED STOLARSKY PRINCIPLE AMS 2020 Central Spring Sectional Meeting: Optimization for Discrete Geometry *Cancelled due to COVID-19	April 2020 Purdue University
DISCRETENESS OF ENERGY MINIMIZING MEASURES NDSU Mathematics Colloquium	3/3/2020 North Dakota State University, Fargo, ND
SUPPORT OF MINIMIZERS OF THE p -FRAME ENERGY Joint Math Meetings: AMS Special Session on Frames, Designs, and Optimal Spherical Configurations	1/15/2020 Denver, CO
Contributed Talks	
SECOND-ORDER ASYMPTOTICS OF MAXIMAL RIESZ POLARIZATION ON THE SPHERE Sphere Packings, Coverings, and Spherical Codes 2023	5/30/2023 Sofia, Bulgaria
RIESZ POTENTIALS WITH EXTERNAL FIELDS: MINIMIZERS AND THEIR DIMENSIONS AMS 2023 Spring Central Sectional Meeting Special Session on the Interface of Geometric Measure Theory and Harmonic Analysis	4/15/2023 U. of Cincinnati, Cincinnati, OH
ENERGY AND DISCREPANCY OF GREEDY SEQUENCES ON THE SPHERE 9th Workshop on High-Dimensional Approximation	2/23/2023 Australian National University, Canberra, Australia

OPTIMALITY OF HARMONIC ENSEMBLES ON TWO-POINT HOMOGENEOUS SPACES 15th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing	7/19/2022 RICAM, Linz, Austria
MINIMIZATION OF MULTIVARIATE GEOMETRIC RIESZ ENERGIES LMS Research School: Point Configurations: Deformations and Rigidity	6/30/2022 University College London, London, UK
MINIMIZING p -FRAME ENERGIES AND MIXED VOLUMES Workshop in Convexity and High-Dimensional Probability	5/23/2022 Georgia Institute of Technology, Atlanta, GA
ENERGY MINIMIZATION ON PROJECTIVE SPACES VIA DETERMINANTAL POINT PROCESSES Workshop on Optimal Point Configurations on Manifolds	1/17/2022 (online) ESI, Vienna, Austria
DISCRETENESS OF ENERGY MINIMIZING MEASURES Analysis & PDE Working Seminar	5/4/2020 Online (University of Minnesota), Minneapolis, MN
SUPPORT OF MINIMIZERS OF THE p -FRAME ENERGY Barcelona Analysis Conference	6/27/2019 Universitat de Barcelona, Barcelona, Spain
MAXIMUM SIZE (k, l) -SUM-FREE SETS IN FINITE ABELIAN GROUPS 17th Workshop on Combinatorial and Additive Number Theory	5/22/2019 City University of New York, New York, NY
MINIMIZERS OF THE p -FRAME ENERGY CONDCOMP Optimal Point Configurations and Potential Theory Workshop	4/11/2019 CIEM, Castro Urdiales, Spain
ENERGY OPTIMIZATION WITH ORTHOGONALIZING POTENTIALS ON THE SPHERE 35th Southeastern Analysis Meeting	3/17/2019 University of Alabama, Tuscaloosa, AL
ENERGY OPTIMIZATION WITH ORTHOGONAL POTENTIALS ON THE SPHERE Discrepancy Workshop	11/28/2018 RICAM, Linz, Austria
ON FEJES TÓTH'S CONJECTURES ON THE SUM OF ANGLES BSM 100/3 Reunion	6/29/2018 BSM, Budapest, Hungary
ON FEJES TÓTH'S CONJECTURES ON THE SUM OF ANGLES 34th Southeastern Analysis Meeting	3/23/2018 Georgia Institute of Technology, Atlanta, GA
FINDING THE MAXIMUM SIZE OF (k, l) -SUM-FREE SETS IN FINITE CYCLIC GROUPS 49th Southeastern International Conference on Combinatorics, Graph Theory & Computing	3/7/2018 Florida Atlantic U., Boca Raton, FL
STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE Joint Math Meetings	1/13/2018 San Diego, CA
STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE SAMSA Conference	11/21/2017 Arusha, Tanzania
STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE 3rd Annual Meeting of the SIAM Central States Section	10/1/2017 Colorado State University, Fort Collins, CO
STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE Program on Tractability of High Dimensional Problems and Discrepancy	9/27/2017 ESI, Vienna, Austria
STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE AMS 2017 Fall Central Sectional Meeting	9/10/2017 University of North Texas, Denton, TX
LOOKING FOR SUM-FREEDOM: THE MAXIMUM SIZE OF (k, l) -SUM-FREE SETS 48th Southeastern International Conference on Combinatorics, Graph Theory & Computing	3/10/2017 Florida Atlantic University, Boca Raton, FL
LOOKING FOR SUM-FREEDOM: THE MAXIMUM SIZE OF (k, l) -SUM-FREE SETS Joint Math Meetings	1/6/2017 Atlanta, GA

- ZEROING IN ON THE BEST SUBSETS:
THE MAXIMUM SIZE OF $(k, 0)$ -SUM-FREE SETS
SAMSA Conference 11/26/2015
University of Namibia, Windhoek, Namibia
- WHEN THINGS GET A LITTLE EDGY: FINDING THE GRUNDY NUMBER OF LINE GRAPHS
MAA MathFest 8/8/2014
Portland, OR
- SUBTRACTION ADDS NOTHING: CALCULATING THE MINIMUM SIZE
OF h -FOLD UNRESTRICTED SIGNED SUMSETS OF m -SIZED SUBSETS OF CYCLIC GROUPS
Joint Math Meetings 1/17/2014
Baltimore, MD
- EDGE-GRUNDY NUMBERS OF COMPLETE MULTIPARTITE GRAPHS
SAMSA Conference 11/28/2013
University of Stellenbosch, Stellenbosch, South Africa
(with Matthew DeVilbiss)
- SUBTRACTION ADDS NOTHING: CALCULATING THE MINIMUM SIZE
OF h -FOLD UNRESTRICTED SIGNED SUMSETS OF m -SIZED SUBSETS OF CYCLIC GROUPS
MAA MathFest 8/2/2013
Hartford, CT
- Poster Presentations**
- POTENTIAL THEORY WITH MULTIVARIATE KERNELS ON THE SPHERE
Foundations in Computational Mathematics
Workshop in Approximation Theory June 2023
Sorbonne Université, Paris, France
- DISCRETENESS OF ENERGY MINIMIZING MEASURES
International Conference on Approximation and Potential Theory March 2020
Georgia Southern University
*Canceled due to COVID-19
- STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE
Workshop in Convexity and Geometric Aspects of Harmonic Analysis 12/9/2019
Georgia Institute of Technology, Atlanta, GA
- STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE
Workshop in Approximation, Sampling, and Compression in High Dimensional Problems 6/20/2019
INI, Cambridge, UK
- MINIMIZERS OF THE p -FRAME ENERGY
Lectures in Fourier Analysis 5/13/2019
University of Wisconsin - Madison, Madison, WI
- MINIMIZERS OF THE PROBABILISTIC p -FRAME POTENTIAL
Frame Theory and Exponential Bases Workshop 6/4/2018
ICERM, Providence, RI
- ON FEJES TÓTH'S CONJECTURES ON THE SUMS OF ANGLES
Optimal and Random Point Configurations Workshop 2/28/2018
ICERM, Providence, RI
- WHAT DIFFERENCE SUBTRACTION MAKES: THE MINIMUM SIZE OF SIGNED SUMSETS
Joint Math Meetings 1/12/2015
San Antonio, TX
- IT JUST DOESN'T ADD UP: THE FROBENIUS NUMBER OF THREE NUMBERS
Joint Math Meetings 1/17/2014
Baltimore, MD
- WHEN THINGS GET A LITTLE EDGY: FINDING THE GRUNDY NUMBER OF LINE GRAPHS
Conference of Research Experiences for Undergraduates Student Scholarship
(with Matthew DeVilbiss) 10/28/2013
Arlington, VA
- WHEN THINGS GET A LITTLE EDGY:
FINDING THE GRUNDY NUMBER OF LINE GRAPHS
HHMI Poster Session 10/25/2013
Gettysburg College, Gettysburg, PA
- SUBTRACTION ADDS NOTHING
24th Sigma Xi Student Research Symposium 4/19/2013
St. Joseph's University, Philadelphia, PA
- Local Presentations (Vanderbilt University)**
- MANY-PARTICLE INTERACTIONS AND MULTIVARIATE GEOMETRIC POTENTIALS
Computational Analysis Seminar 11/3/2022

Local Presentations (University of Minnesota - Twin Cities)

ENERGY OPTIMIZATION ON THE SPHERE Master's Thesis and Oral Preliminary Exam	4/2/2019
STOLARSKY PRINCIPLE AND ENERGY OPTIMIZATION ON THE SPHERE Analysis and PDE Working Seminar	4/18/2017
ZEROING IN ON THE BEST SUBSETS: THE MAXIMUM SIZE OF $(k, 0)$ -SUM-FREE SETS Math Club	1/28/2016

Local Presentations (Gettysburg College)

WHAT CAN SUBTRACTION ADD TO SUMS? Mathematics Colloquium	1/23/2014
WHAT CAN SUBTRACTION ADD TO SUMS? Mathematics Research Symposium	12/5/2013
WHEN THINGS GET A LITTLE EDGY: FINDING THE GRUNDY NUMBER OF LINE GRAPHS Mathematics Colloquium	9/12/2013
NO NEGATIVE CONSEQUENCES Mathematics Research Symposium	5/2/2013

Non-Research Presentations

MINIMAL RIESZ ENERGY POINT CONFIGURATIONS FOR RECTIFIABLE d -DIMENSIONAL MANIFOLDS Summer School on Sphere Packings and Optimal Configurations	10/2/2019 Kopp, Germany
OPTIMAL ASYMPTOTIC BOUNDS FOR SPHERICAL DESIGNS Analysis and PDE Working Seminar	12/8/2017 University of Minnesota - Twin Cities
GLACIALLY SLOW GLACIERS: A QUADRATIC APPROXIMATION TO BUDYKO'S ICE-ALBEDO FEEDBACK MODEL WITH THE LINE DYNAMICS Climate Modeling Seminar	4/26/2016 University of Minnesota - Twin Cities
FIXED AND FURIOUS: FIXED POINTS IN MATHEMATICS Mathematics Capstone Colloquium	12/11/2014 Gettysburg College
SIGNAL AND IMAGE ANALYSIS Mathematics Colloquium	11/15/2012 Gettysburg College

TEACHING EXPERIENCE

Instructor, Vanderbilt University

MATH 2610/5610: Ordinary Differential Equations	Fall 2024
MATH 1300: Accelerated Calculus 1	Fall 2023

Instructor, Technische Universität Graz

MAT.784UF: Elective Subject Mathematics: Harmonic Analysis	Spring 2022
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Instructor, University of Minnesota (College of Liberal Arts)

MATH 4603: Advanced Calculus 1	Summer 2020
MATH 4993: Directed Study (Research in Graph Theory and Additive Combinatorics)	Spring 2018

- Two of the students, with another collaborator, published a paper based on initial results they found during this course (A. Adams, C. Hall, E. Stucky, Classifications of ℓ -Zero-Sumfree Sets. *The PUMP Journal of Undergraduate Research*, **2**, 179-198 (2019)).

Teaching Assistant, University of Minnesota

MATH 2473: UM Talented Youth Mathematics Program Calculus 3 MathCEP	Spring 2020
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MATH 2472: UM Talented Youth Mathematics Program Calculus 3 MathCEP	Fall 2019
MATH 2283: Sequences, Series, and Foundations College of Liberal Arts	Fall 2019
MATH 2471: UM Talented Youth Mathematics Program Calculus 2 MathCEP	Spring 2019
MATH 1473: UM Talented Youth Mathematics Program Calculus 2 MathCEP	Fall 2018
MATH 3592H: Honors Math 1 College of Liberal Arts	Fall 2017
MATH 1272: Calculus II College of Liberal Arts	Spring 2017
MATH 1142: Short Calculus College of Liberal Arts	Spring 2016
MATH 1271: Calculus I College of Liberal Arts	Fall 2015

Grader, University of Minnesota

MATH 5705: Enumerative Combinatorics	Fall 2015
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Instructor, UMN MathCEP (Saturday Morning Enrichment Program)

FRACTALS Professions & Recreations: Intermediate Mathematics Enrichment	11/2/2019
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TAXI CAB GEOMETRY Young Emerging Scholars	12/2/2017
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Peer Learning Assistant, Gettysburg College

MATH 315: Abstract Math 2	Spring 2015
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MATH 215: Abstract Math 1	Fall 2014, Spring 2013
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MATH 301: Intermediate Research in Mathematics	Fall 2013
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MATH 201: Introductory Research in Mathematics	Fall 2013
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MATH 112H: Honors Calculus 2	Fall 2012
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LATEX WRITING Math Department	Fall 2013
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PHYSICS 310: Introduction to Quantum Mechanics	Fall 2014
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PHYSICS 103: Elementary Physics	Fall 2013
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PHYSICS 101: The Evolving Universe	Fall 2012
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Lab Assistant, Gettysburg College

PHYSICS 240: Electronics	Spring 2015
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MathPath

Counselor and Instructor for LINEAR SET GEOMETRY	June-July 2016 Macalester College, St. Paul, MN
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Counselor	June-July 2015 Lewis & Clark College, Portland, OR
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MENTORING

Vanderbilt University

MENTOR, DIRECTED READING PROGRAM

Spring 2023

University of Minnesota

MENTOR, DIRECTED READING PROGRAM

Spring 2020

PAL, MATHEMATICS PROJECT AT MINNESOTA (MPM)

Spring 2019

- MPM is a four day workshop for undergraduates underrepresented in mathematics
- Met undergraduate student once a month to discuss math and give advice

FIRST YEAR PEER MENTOR

2016–2019

LEADERSHIP & SERVICE

CONFERENCE ORGANIZER

May 2025

Constructive Functions 2025

Vanderbilt University, Nashville, TN

<https://my.vanderbilt.edu/constructivefunctions2025/>

CO-ORGANIZER

January 2025

AIM Special Session Energy minimization in various areas of mathematics:

Seattle, WA

from analysis to discrete geometry

2025 Joint Math Meeting

CO-ORGANIZER

October 2024

AMS Special Session on Interactions, Discrepancies, Approximations:

Georgia Southern University, Savannah, GA

from Energy Optimization to Dynamics

AMS 2024 Fall Southeastern Sectional Meeting

CO-ORGANIZER

September 2023-May 2024

Computational Analysis Seminar

Vanderbilt University, Nashville, TN

CO-ORGANIZER

October 2023

AMS Special Session on Dynamics and Equilibria of Energies

University of South Alabama, Mobile, AL

AMS 2023 Fall Southeastern Sectional Meeting

CO-ORGANIZER

May 2023

Minisymposium: Applications of Discrete and Continuous Energy

Vanderbilt University, Nashville, TN

2023 Shanks Conference

ORGANIZER

October 2022 - May 2023

Point Configurations and Related Equilibria Seminar

Vanderbilt University

CO-ORGANIZER

July 2022

Special Session: Energy-minimizing Point Configurations and Measures I

RICAM, Linz, Austria

15th International Conference on Monte Carlo

and Quasi-Monte Carlo Methods in Scientific Computing

CO-ORGANIZER

June 2020 - May 2022

Point Distribution Webinar <https://vlasiuk.com/PDseminar/>

CO-ORGANIZER

Fall 2020, Spring 2021

Harmonic Analysis, Geometric Measure Theory,

& Partial Differential Equations Seminar

<https://sites.google.com/view/hagmtpdeseminar>

CO-ORGANIZER Summer 2020
Analysis & PDE Working Summer Seminar
<https://sites.google.com/view/summerseminar>

TREASURER, PRESIDENT, WEBMASTER 2017–2020
University of Minnesota AMS Student Chapter

- Co-organized a weekly “Introduction to Research Seminar”, aimed at introducing new students to faculty members and their research, to help students find Ph.D. advisors.
- Co-organized the annual “Prelim Bee”, an informal, jeopardy-style event to help graduate students prepare for their preliminary exams.
- Co-organized a weekly tea for graduate students to help build a sense of community.
- Co-organized a “Games Fair” outreach event at the Minnesota Internship Center (St. Paul, MN).
- Applied for and received \$450 from the University of Minnesota Student Unions & Activities Fund for the AMS 2019 Prelim Bee.
- Applied for and received \$2616 from the University of Minnesota Student Service Fees Fund for AMS events for Spring 2020.

REFEREE
Australasian Journal of Combinatorics,
Journal de Théorie des Nombres de Bordeaux,
Mathematika,
Proceedings of the American Mathematical Society,
SIAM Journal on Mathematical Analysis
Integers: Electronic Journal of Combinatorial Number Theory
Journal of Computational and Applied Mathematics
Discrete Mathematics
Information and Inference: A Journal of the IMA

REVIEWER Spring, Summer, Fall 2020
UMN Council of Graduate Students Travel & Career Development Grants

VINCENT HALL THESPIAN 2016-2020
UMN Mathematics Department Open House and Graduate TA Orientation

- Practiced and performed skits to inform prospective graduate students about graduate life in the UMN mathematics department for the Open House. We then had a panel in which we answered additional questions the prospective students might have.
- Practiced and performed skits to inform incoming graduate students about being a TA in the UMN mathematics department, and how to handle different situations. We then had a panel in which we answered additional questions the incoming students might have.

HOST 2016-2019
UMN Mathematics Department Open House

VOLUNTEER August 2016
Minnesota State Fair UMN Women in Mathematics Booth

HOUSE LEADER 2014–2015
Gettysburg College Science House

PRESIDENT, SECRETARY, CHARTER MEMBER 2012–2014
Gettysburg College Pi Mu Epsilon Chapter

SELECTED WORKSHOPS, SUMMER/WINTER SCHOOLS, AND RESEARCH PROGRAMS

LMS SUMMER RESEARCH SCHOOL IN POINT CONFIGURATIONS: June-July 2022
DEFORMATIONS AND RIGIDITY University College London, London, UK

WORKSHOP IN CONVEXITY AND HIGH-DIMENSIONAL PROBABILITY May 2022
Georgia Institute of Technology, Atlanta, GA

COLLABORATE@ICERM “CODES AND DESIGNS: OPTIMAL DISCRETE MEASURES” August 2021
ICERM, Providence, RI

WORKSHOP ON MINIMAL ENERGIES WITH RIESZ POTENTIALS May 2021
(online) American Institute of Mathematics, San Jose, CA

WINTER SCHOOL ON THE INTERPLAY BETWEEN HIGH-DIMENSIONAL GEOMETRY AND PROBABILITY	January 2021 (online) Hausdorff Institute of Mathematics, Bonn, Germany
MASAMU ADVANCED STUDY INSTITUTE AND WORKSHOPS IN MATHEMATICAL SCIENCES	November 2020 (online)
ONLINE SUMMER SCHOOL ON OPTIMIZATION, INTERPOLATION, AND MODULAR FORMS	August 2020 (online) EPFL, Lausanne, Switzerland
WORKSHOP IN CONVEXITY AND GEOMETRIC ASPECTS OF HARMONIC ANALYSIS	December 2019 Georgia IT, Atlanta, GA
SUMMER SCHOOL ON SPHERE PACKINGS AND OPTIMAL CONFIGURATIONS	October 2019 Kopp, Germany
WORKSHOP IN APPROXIMATION, SAMPLING, AND COMPRESSION IN HIGH DIMENSIONAL PROBLEMS	June 2019 INI, Cambridge, UK
CONDCOMP OPTIMAL POINT CONFIGURATIONS AND POTENTIAL THEORY WORKSHOP	April 2019 CIEM, Castro Urdiales, Spain
DISCREPANCY WORKSHOP	November 2018 RICAM, Linz, Austria
SUMMER SCHOOL IN HARMONIC ANALYSIS	July 2018 PCMI, Park City, UT
FRAME THEORY AND EXPONENTIAL BASES WORKSHOP	June 2018 ICERM, Providence, RI
OPTIMAL AND RANDOM POINT CONFIGURATIONS WORKSHOP	February 2018 ICERM, Providence, RI
MASAMU ADVANCED STUDY INSTITUTE AND WORKSHOPS IN MATHEMATICAL SCIENCES	November 2017 Arusha, Tanzania
PROGRAM ON TRACTABILITY OF HIGH DIMENSIONAL PROBLEMS AND DISCREPANCY	September 2017 ESI, Vienna, Austria
MASAMU ADVANCED STUDY INSTITUTE AND WORKSHOPS IN MATHEMATICAL SCIENCES	November 2015 Windhoek, Namibia
REU IN MATHEMATICS	Summer 2014 University of West Georgia, Carrollton, GA
MASAMU ADVANCED STUDY INSTITUTE AND WORKSHOPS IN MATHEMATICAL SCIENCES	November 2013 Stellenbosch, South Africa
REU PROGRAM IN ALGEBRA AND DISCRETE MATHEMATICS	Summer 2013 Auburn University, Auburn, AL
MTCP PRE-REU	Summer 2012 Texas A & M University, College Station, TX

PROFESSIONAL AFFILIATIONS

AMERICAN MATHEMATICAL SOCIETY