

Wöden Kusner

August 2020

CITIZENSHIP USA

RESEARCH Optimal Geometry, Topology of Configuration Spaces, Probability and Measure Theory,
INTERESTS Representation Theory, Statistical Mechanics and Condensed Matter.

EDUCATION **University of Pittsburgh**, Pittsburgh, PA USA

Ph.D., Mathematics, August 2014

Advisor: Professor Thomas C. Hales

Dissertation: *Bounds on packing density via slicing*

M.A., Mathematics, December 2010

Haverford College, Haverford, PA USA

B.S., Mathematics, May 2007

Advisor: Professor John J. Flynn

Thesis: *Results in sphere packing density*

CERTIFICATES **Vanderbilt University**, Nashville, TN USA

Certificate in College Teaching, May 2019

STEM Teaching Specialization, June 2020

ACADEMIC **Assistant Professor (NTT)** 2020 - present
APPOINTMENTS Department of Mathematics
University of Georgia

Assistant Professor (NTT) 2017 - 2020
Department of Mathematics
Data Science Institute Faculty Affiliate
Vanderbilt University

Postdoctoral Associate 2017 - 2020
Center for Constructive Approximation
Vanderbilt University

FWF Postdoctoral Researcher 2014 - 2017
Institute of Analysis and Number Theory
Graz University of Technology

Visiting Scholar
Fields Institute 2021
ICERM, Brown University 2015, 2018
Erwin Schrödinger International Institute, University of Vienna 2014

- PUBLICATIONS
- with G. Buck, R. Kusner. Stopper knots. (*in preparation*).
 - with G. Dietler, E. Rawdon, R. Kusner, P. Szymczak. Chirality for crooked curves. (*submitted*).
 - with R. Kusner. A Gordian pair of links. (*submitted*).
 - with J. Brauchart, P. Grabner, J. Ziefle. Hyperuniform point sets on the sphere: probabilistic aspects. To appear in *Monatshefte für Mathematik*.
 - with T. Hales. Packings of regular pentagons in the plane. To appear in *Contemporary Mathematics (Festschrift for W. Kuperberg)*.
 - with R. Kusner, J. Lagarias, S. Shlosman. Configuration spaces of equal spheres touching a given sphere: the twelve spheres problem. *Bolyai Society Mathematical Studies: New Trends in Intuitive Geometry*, 2018.
 - with J. Brauchart, P. Grabner. Hyperuniform point sets on the sphere: deterministic aspects. *Constr Approx*, 2018.
 - with Y. Kallus. The local optimality of the double lattice packing. *Discrete Comput Geom*, 2016.
 - On the densest packing of polycylinders in any dimension. *Discrete Comput Geom*, 2016.
 - An upper bound on packing density for circular cylinders of high aspect ratio. *Discrete Comput Geom*, 2014.
- TALKS AND CONFERENCES
- Veszprém Discrete Mathematics and Applications Conference: *TBA*. */2* (postponed)
 - ESI Workshop: *TBA*. */2* (postponed)
 - Auburn University Colloquium *TBA*. */20
 - UGA Geometry Seminar *TBA*. */20
 - UGA Topology Seminar: *Chirality and hydrodynamics (la Lord Kelvin)*. 8/31/20
 - BIRS-CMO Workshop : *Gordian unlinks* 9/*/19
 - 4th International Conference on Packing Problems, Yale. 6/*/19
 - Topology and its Applications, WKU: *Gordian configurations* (II). 7/17/18
 - ICERM Seminar, Brown: *Gordian configurations* (I). 4/11/18
 - ICERM Seminar, Brown: *Computing discrepancy*. 3/9/18
 - Aspen Center for Physics, 6/*/2017
 - Montanuniversität Leoben: *Critical packings & the radius function*. 6/2/17
 - CEIM, Universidad de Cantabria: *Critical packings (in the sphere)*. 4/22/17
 - JMM: Dis. Geo. & Con.: *Critical packings, rigidity, & the radius function*. 1/6/17
 - TU Graz, Fall School: *Critical packings, rigidity, & the radius function*. 9/30/16
 - AIM Workshop: *Configurations of spheres*. 9/22/16
 - ICERM Workshop, Brown 9/*/16
 - ACG Seminar, Pittsburgh: *Configurations of spheres*. 8/25/16
 - MCQMC, Stanford: *Config. of pts w.r.t. discrepancy & unif. distribution*. 8/17/16
 - MSRI: *Critical packings, rigidity, & the radius function*. 8/4/16
 - MSRI Summer Research */16
 - Institut Henri Poincaré Workshop, 6/*/16
 - Special Session on New Developments in Discrete and Intuitive Geometry, AMS Spring SE Sectional: *Config. of pts w.r.t. discrepancy & unif. distribution*. 3/6/16
 - Advanced Topics Seminar, TU Graz: *Configurations of spheres*. 1/22/16
 - Zahlentheoretisches Kolloquium, TU Graz: *Problems with packing periodicity*. 12/11/15
 - ICERM, Brown: *Can rods pack space more densely than disks the plane?* 4/28/15
 - ICERM, Brown: *Spherical discrepancy*. 4/9/15
 - TU Graz: *Computing spherical cap discrepancy: proof of concept*. 1/22/15
 - Guest Lecture, TU Graz: *Introduction to packing problems*. 1/19/15
 - Large Structures Seminar, Aalto: *Packing density bounds in higher dimensions*. 11/22/14
 - ESI Workshop: *A brief analysis of regular pentagon packings in the plane*. 8/27/14
 - IAS – PCMI Researcher: Mathematics and Materials. 6/*/14
 - Oberwolfach: *Packing polycylinders*. 6/*/14
 - Dissertation Defense, Pittsburgh: *Bounds on packing density via slicing*. 5/22/14

- Seminar, TU Graz: *Packing density bounds via slicing*. 5/8/14
- Erdős Memorial Lectures, Memphis: *Polycylinder density in higher dimensions*. 3/14
- Fields Institute: Workshop in Discrete Geometry. 11/*/13
- GSS, Pittsburgh: *Some packing problems & an upper bound*. 3/28/13
- A&S Graduate Expo, Pittsburgh: *Packing cylinders with high aspect ratio*. 3/23/13
- ACG Seminar, Pittsburgh: *An upper bound on packing density for circular cylinders with high aspect ratio*. 2/12/13
- Topological Dynamics Workshop, Newton Institute: *Packing circular cylinders*. 11/*/12
- IMA Summer School in Topological Methods, Penn. 7/*/11
- Graduate Algebra, Combinatorics and Geometry Seminar, Pittsburgh:
 - *The Jones Polynomial and the Kauffman Bracket*
 - *Category Theory V (Representable Functors)*
 - *Category Theory IV (Limits Informally/Formally)*
 - *Category Theory III (Slice and Comma Categories)*
 - *Category Theory II (Products and Limits)*
- Senior Thesis Defense, Haverford: *Results in sphere packing density*. 5/*/07

OTHER WORKS - Untitled Work in *To Be or Knot to Be* at The Museum of Everyday Life, 20

HONORS & AWARDS - Work featured in [Die Presse: Science and Innovation](#), 17
 - University of Pittsburgh Honors Convocation 13, 14
 - Outstanding Lecture/Presentation: University Graduate Expo 13
 - Leroy Irvis Fellow: University of Pittsburgh 09, 12
 - Bronze Presidential Service Award for AmeriCorps Volunteer Service 08

TEACHING **University of Georgia**, Athens, GA USA

Assistant Professor (NTT) 8/20 -
 - Instructor for MATH 2550: Calculus I (2 sections) Fall 20

Vanderbilt University, Nashville, TN USA

Assistant Professor (NTT) 8/17 - 5/20
 - Instructor for MATH 2300: Multivariable Calculus Spring 20
 - Instructor for MATH 2300: Multivariable Calculus (2 sections) Fall 19
 - Supervisor for Undergraduate Summer Research (3 students) Summer 19
 - Instructor for MATH 3641/5641: Mathematical Statistics Spring 19
 - Instructor for MATH 2300: Multivariable Calculus Fall 18
 - Instructor for MATH 1010: Prob. & Stat. Inference I Fall 18
 - Supervisor of undergraduate TAs in MATH 1010 (3 sections) Fall 18
 - Instructor for MATH 3641/5641: Mathematical Statistics Spring 18
 - Instructor for MATH 1011: Prob. & Stat. Inference II Spring 18
 - Supervisor of undergraduate TAs in MATH 1011 (3 sections) Spring 18
 - Instructor for MATH 1010: Prob. & Stat. Inference I Fall 17
 - Supervisor of undergraduate TAs in MATH 1010 (3 sections) Fall 17

Graz University of Technology, Graz, AT

Lehrbeauftragter 10/14 - 1/15, 3/16 - 6/16
 - Instructor for MAT.670: Packings, Lattices and Configurations Summer 16
 - Assistant for MAT.902: Höhere Analysis Winter 14

University of Pittsburgh, Pittsburgh, PA USA

<i>Teaching Fellow</i>	9/10 - 12/11	
- Assistant for Math 0220: Calculus I (2 sections)		Fall 11
- Assistant for Math 2700: Graduate Topology		Fall 11
- Assistant for Math 1700: Topology		Spring 11
- Assistant for Math 1410: Foundations of Mathematics		Spring 11
- Assistant for Math 1250: Abstract Algebra II		Spring 11
- Assistant for Math 0230: Calculus II		Fall 10
- Assistant for Math 0220: Calculus I (2 sections)		Fall 10
<i>Teaching Assistant</i>	9/09 - 8/10	
- Instructor for Math 0120: Business Calculus		Summer 10
- Assistant for Math 0120: Business Calculus (3 sections)		Spring 10
- Assistant for Math 0240: Calculus III (3 sections)		Fall 09

Sample material and evaluations available upon request.

SERVICE	<ul style="list-style-type: none">- Active mentor for summer research projects, undergraduate theses and graduate research.- Active referee and reviewer for various journals and scientific bodies, including (Constr. Approx., Exp. Math, IMRN, SIAM, NWO, European Science Foundation)- Research Mentor for Kevin Hu, B.S. Highest Honors 2020 (Vanderbilt)- Leadership Committee: Haverford College Multicultural Alumni Action Group- Website Maintainer: CCA and CA Seminar- Honors Thesis Committee for David K. Zhang, B.S., Founders Medal 2019 (Vanderbilt)- Dissertation Committee for Oleksandr Vlasiuk, Ph.D. 2018 (Vanderbilt)- Co-organizer: Shanks Workshop- Organizer: Computational Analysis Seminar- Co-organizer: From the Fundamental Lemma to Discrete Geo. to Formal Verification- Research Mentor for Jonas Zifile (Graz)- Representative: Dietrich School of Arts and Sciences Council 2012 - 2014- Delegate: Arts and Sciences Graduate Student Organization, 2011 - 2014- President: Mathematics Graduate Student Organization, 2013 - 2014- Treasurer: Mathematics Graduate Student Organization, 2011 - 2013- Treasurer: SIAM University of Pittsburgh Chapter, 2010 - 2011- Organizer: Graduate Seminar in Algebra, Combinatorics and Geometry- AMS, APS, AWM, IEEE, NCFDD, SIAM
---------	---

TECHNICAL SKILLS	Familiarity with $\text{T}_{\text{E}}\text{X}$ ($\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$, $\text{BIB}_{\text{T}}\text{E}_{\text{X}}$), Mathematica, Python, Julia.
------------------	---

LANGUAGES	English (Native), German (Intermediate), Spanish (Elementary).
-----------	--

REFERENCES	Please contact me for references.
------------	-----------------------------------