Wöden Kusner

Fall 2020

CITIZENSHIP	USA

RESEARCH INTERESTS

Optimal Geometry, Topology of Configuration Spaces, Probability and Measure Theory, 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 APPOINTMENTS

Assistant Professor (NTT)　　2020 - present
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 (à 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

Teaching Fellow   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

Teaching Assistant   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
- 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 Zifle (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 TeX (LaTeX, BibTeX), Mathematica, Python, Julia.

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

REFERENCES
Please contact me for references.