Wöden B. Kusner

Contact Information

Institute for Analysis and Number Theory
Graz University of Technology
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Citizenship USA

Research Interests Discrete and Metric Geometry, Topological and Geometric Frustration, Emergent Phenomena, Geometric Analysis, Geometric Measure Theory, Integral Geometry, Representation Theory

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, August 2010

Haverford College, Haverford, PA USA

B.S., Mathematics, May 2007

Advisor: Professor John J. Flynn
Thesis: *Results in sphere packing density*

Academic Appointments

Postdoctoral Researcher September 2014 to present
Institute for Analysis and Number Theory
Graz University of Technology

Papers

Wöden Kusner. An upper bound on packing density for circular cylinders of high aspect ratio. *Discrete Comput. Geom.* **52**(4):964-972, 2014. http://arxiv.org/abs/1309.6996

Wöden Kusner. On the densest packing of polycylinders in any dimension. *ArXiv preprint*: http://arxiv.org/abs/1405.0497

Yoav Kallus and Wöden Kusner. The local optimality of the double lattice packing. *ArXiv preprint*: http://arxiv.org/abs/1509.02241

Talks and Conferences

ICERM Research Seminar, Brown University. *Can rods pack space more densely than disks pack in the plane?* April 28th, 2015.

ICERM Postdoc and Graduate Student Seminar, Brown University. *Spherical discrepancy.* April 9, 2015.

Visitor, Brown University – ICERM: Phase Transitions and Emergent Properties. February-May 2015.

Working Problems Session, TU Graz: *Computing spherical cap discrepancy: proof of concept.* January 22, 2015.

Guest Lecture, TU Graz: *Introduction to packing problems.* January 19, 2015.

Large Structures Seminar, Aalto University: *Packing density bounds in higher dimensions.* November 22, 2014.

ESI Workshop: *A brief analysis of regular pentagon packings in the plane.* October 27, 2014.

Visitor, University of Vienna – ESI: Minimal Energy Point Sets. October 2014.

Researcher, IAS – PCMI: Mathematics and Materials. July 2014.

Oberwolfach Seminar: Recent Methods in Sphere Packing and Optimization. *Packing polycylinders.* June 2014

Dissertation Defense, University of Pittsburgh: *Bounds on packing density via slicing.* May 22, 2014

Seminar, TU Graz: *Packing density bounds via slicing.* May 8, 2014

Erdős Memorial Lectures, University of Memphis: *Revisiting Bezdek and Kuperberg: A sharp upper bound for the packing density of polycylinders in higher dimensions.* March 2014

Fields Institute Workshop in Discrete Geometry, Fields Institute. November 2013

Graduate Student Seminar, University of Pittsburgh: *Some packing problems and an upper bound.* March 28, 2013

Dietrich School of Arts and Sciences Graduate Expo, University of Pittsburgh: *Packing cylinders with high aspect ratio.* March 23, 2013

Algebra, Combinatorics and Geometry Seminar, University of Pittsburgh: *An upper bound on packing density for circular cylinders with high aspect ratio.* February 12, 2013

Topological Dynamics Workshop, Isaac Newton Institute: *Packing circular cylinders.* November 2012

IMA Summer School in Topological Methods, University of Pennsylvania. 2011

Graduate Algebra, Combinatorics and Geometry Seminar, University of 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 College: *Results in sphere packing density.* May 2007

Awards

University of Pittsburgh Honors Convocation 2013, 2014

Outstanding Presentation: Graduate Expo 2013

University of Pittsburgh Irvis Fellowship 2009, 2012

Bronze Presidential Service Award for AmeriCorps Volunteer Service 2008

Teaching Experience

Graz University of Technology, Graz, AT

Lehrbeauftragter October 2014 to January 2015

Assistant for MAT.902: Höhere Analysis
Winter 2014 (1 section)

University of Pittsburgh, Pittsburgh, PA USA

Teaching Fellow September 2010 to December 2011

Assistant for Math 0220: Calculus I
Fall 2011 (3 sections)

Assistant for Math 1700: Topology
Spring 2011

Assistant for Math 1410: Foundations of Mathematics
Spring 2011

Assistant for Math 1250: Abstract Algebra 2
Spring 2011

Assistant for Math 0230: Calculus 2
Fall 2010

Assistant for Math 0220: Calculus 1
Fall 2010 (2 sections)

Teaching Assistant September 2009 to August 2010

Instructor for Math 0120: Business Calculus
Summer 2010
Responsible for lectures and course material

Assistant for Math 0120: Business Calculus
Spring 2010 (3 sections)

Assistant for Math 0240: Calculus 3
Fall 2009 (3 sections)

Sample material and student evaluations available upon request

Professional Experience

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, 2010 - 2011

Technical Skills

TEX (LATEX, BIBTEX), Mathematica.

References

Please contact me for references.