# Wöden B. Kusner


**Contact Information**

Institute for Analysis and CNT
Technische Universität Graz
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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: John J. Flynn
Thesis: *Results in sphere packing density*

**Papers**

Kusner, W. 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

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

Kusner, W. Slicing linear programs: local criticality of the conjectured optimal density pentagon packing. *In preparation*

**Talks and Conferences**

Visitor, Brown University – ICERM. February-May 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 *(attended)*

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 *(attended)*

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

**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.