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Gregory Henselman

Postdoctoral Research Associate, Princeton University

Education

2011 – 2017 **PhD Electrical & Systems Engineering**, *School of Engineering & Applied Science*, University of Pennsylvania, USA. Home: http://www.ese.upenn.edu.

2010 – 2011 **MS Mathematics**, *Department of Mathematics*, University of Oregon, USA. Home: http://math.uoregon.edu.

2010 **BA Mathematics & Classical Studies**, *Magna Cum Laude*, Willamette University, USA. Home: http://www.willamette.edu.

Research & Teaching

Research Algebraic combinatorics, Computational topology, Discrete optimization, Topological data analysis.

Teaching Educational testing & measurement, adaptive methods for ADHD, media-aided design.

2015 Teaching Assistant. *Decision Models*, Coursera. Supervised by Rakesh Vohra.

2014 Teaching Assistant. *Calculus: Single Variable*, Coursera. Supervised by Robert Ghrist.

2010-2011 Instructor of Record. Math 111 *Precalculus* and Math 251 *Introduction to Calculus.*

Employment

2017 *Postdoctoral Research Associate*, Princeton University.

2015 *TA Trainer*, Center for Teaching and Learning, University of Pennsylvania

2012 *Intern*, United Technologies Research Center.

2010 – 2011 *Graduate Teaching Fellow*, University of Oregon.

Publications

2017 *Matroids and Canonical Forms: Theory and Applications (Doctoral Thesis)*

2016 *Matroid Filtrations and Computational Persistent Homology*

2014 *Combinatorial invariants of multidimensional topological network data*, IEEE Global Signal & Information Processing Symposium.

Invited Talks

Oct-Nov 2017 Institute for Advanced Study, *Lecture Series: Modularity, the (Ancient) Language of Classification, for Abelian Categories.*

June 2017 Campus Biotech, *Canonical Forms and Persistence Modules: Toward Combinatorial Foundations in TDA*

May 2017 Banff International Research Station, *Circuits, Filtrations, and Matrix Factorization: The Role of Matroids in Fast Persistent Homology Computation*

April 2017 Brown University, *Canonical Forms in TDA*

April 2017 Applied Algebraic Topology Network, *Matroids and Canonical Forms: Theory and Applications*

March 2017 Alan Turing Institute, *Combinatorial Homology: A Simplified Approach to Persistence and Computation, via Matroids*

January 2017 Joint Math Meetings, *The Combinatorial Linear Chain Complex*

June 2016 Institute for Advanced Study, *Möbius Inversion, Morse Theory, and Homological Persistence*, Institute for Advanced Study

January 2016 Joint Math Meetings, *Matroids, Morse Theory, and Fast Persistent Homology Computations*

November 2015 Rutgers University, *A Morse-Theoretic Algorithm to Compute Persistent Homology, with Generators*

October 2015 Lehigh University, *Cellular Matroids & Applications*

September 2015 Columbia University, Data, Algorithms, and Problems on Graphs, *A novel algorithm for persistent homology, with applications to neuroscience*

September 2015 Oxford University, Computational Algebraic Topology School, *Basic Persistence: Matroids and Morse Theory for Spaces with Big Cliques*

February 2015 University Pennsylvania Applied Topology Seminar, *Cellular matroids & Topological Data Analysis.*

December 2014 IEEE Global Signal & Information Processing Symposium, *Combinatorial Invariants of Multidimensional Topological Network Data (poster).*

November 2014 University Pennsylvania Mathematics Student Seminar, *Introduction to matroids & applications.*

February 2014 University Pennsylvania ESE Department Seminar, *Duality for Nonlinear Flows: Maxwell's Equations and Beyond.*

July 2012 United Technologies Research Center, *Sheaves & Applications.*

June 2011 University Oregon, WETSK. *Euler Integration and the Euler-Bessel/Euler-Fourier Transforms.*

May 2011 University Oregon, Homotopy Seminar. *Persistent Homology and Data Analysis.*

April 2011 Willamette University, Colloquium. *Topological Robotics: Theorems & Examples.*

January 2010 University Oregon, Homotopy Seminar. *Homological Approachs to Network Coverage.*

May 2008 Willamette University, Presidential Thesis Defense. *Deterministic Generation of Three-Regular Graph Representations for One-Face Maps.*

Awards and Certifications

2015 CTL Teaching Certificate, University of Pennsylvania

2009 Charles W. & Elizabeth H. Curtis Award

2009 M. Glockers Garner Award

2008 Phi Beta Kappa

2007 Presidential Research Grant in Mathematics, Willamette University

2006 Willamette University Class of 1965 Scholarship

2004 Honors at Entrance, Willamette University

Service

Teaching Assistance, Summer@ICERM

Workshop Leader, Graduate Teaching Assistant Training, University of Pennsylvania Center for Teaching and Learning

Founder/Coordinator, Graduate Student Seminar, Electrical/Systems Engineering Department

Volunteer Coordinator, FIRST LEGO League Championship

Professional Memberships

American Mathematical Society
Institute of Electrical and Electronics Engineers
Association for Women in Mathematics

References

Professor Robert Ghrist
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Updated

May 2017