

## HANS MATTHEW RIESS

---

Information	Email: hans@hansriess.com Mailing address: 226 W. Rittenhouse Sq. Apt. 814 Philadelphia, PA 19103 Phone: +1 812 3404425 LinkedIn: hansriess Twitter: @hansmriess Webpage: hansriess.com
Research Interests	Topological Data Analysis (TDA) Applied Lattice Theory Combinatorial Optimization Deep Learning & Graph Neural Networks Logic & Semantics in Multi-Agent Systems
Education	<b>University of Pennsylvania</b> Philadelphia, Pennsylvania Doctoral Candidate in Electrical and Systems Engineering August 2017 – December 2022 (expected) Adviser: Robert Ghrist  <b>Duke University</b> Durham, North Carolina Bachelors of Science in Mathematics August 2013 – May 2016
Awards and Fellowships	<i>Leggett Family Endowed Fellowship</i> , University of Pennsylvania, 2018 <i>Ganster Fellowship</i> , University of Pennsylvania, 2017
Grants	Team member, THEORINET, <i>Mathematics of Deep Learning</i> , Simons Foundation Center for Computational Mathematics, 2020 – Team member, Social Information/Opinion Dynamics and Optimization, <i>Socio-Mathematics of Information and Influence</i> , Under Secretary of Defense for Research and Engineering, 2021 – Team member, Geometric Optimization and Combinatorial Homological Programming (GOCHoP), <i>DARPA Lagrange Program</i> , 2018 – 2019

Journal Publications	<p>Robert Ghrist and <b>Hans Riess</b> (2021). “Cellular Sheaves of Lattices and the Tarski Laplacian.” To appear in <i>Journal of Homology, Homotopy, and Application</i>.</p> <p>M. Cantanzaro, J. Curry, B. Fasy, J. Lazovskis, G. Malen, <b>Hans Riess</b>, B. Wei, &amp; M. Zabka (2020). “Moduli Spaces of Morse Functions for Persistence.” Published in <i>Journal of Applied and Computational Topology</i>.</p>
Conference Proceedings	<p><b>Hans Riess</b>, Yiannis Kantaros, George Pappas, &amp; Robert Ghrist (2020). “A Temporal Logic-Based Hierarchical Network Connectivity Controller.” Proceedings of <i>2021 SIAM Control Theory Conference</i>.</p> <p><b>Hans Riess</b> and Jakob Hansen (2020). “Multidimensional Persistence Module Classification via Lattice-theoretic Convolution.” <i>NeurIPS: Topological Data Analysis and Beyond</i>.</p>
Extended Abstracts	<b>Hans Riess</b> , Paige Randall-North, & Robert Ghrist (2021). “Network Sheaves Valued in Categories of Adjunctions.” <i>Applied Category Theory Conference</i> .
Preprints	Alejandro Parada-Mayorga, <b>Hans Riess</b> , Alejandro Ribeiro, & Robert Ghrist (2020). “Quiver Signal Processing.”
Expository	Hans Riess (2020). “Beyond Persistent Homology: A Mathematical Guide.”
Talks	<p><i>Graph Neural Networks and the Tarski Laplacian</i>, Mathematics of Deep Learning Retreat, August 2021</p> <p><i>A Temporal Logic-Based Hierarchical Network Connectivity Controller</i>, SIAM Conference on Control Theory, July 2021</p> <p><i>Network Sheaves Valued in Categories of Adjunctions</i>, Applied Category Theory Conference, July 2021</p> <p><i>A Lattice-theoretic Laplacian for Cellular Sheaves</i>, SIAM Computational Science and Engineering Conference, March 2021</p> <p><i>Tarski Sheaves</i>, Applied Topology in Albany Seminar, February 2021</p> <p><i>Cellular Sheaves and the Tarski Laplacian</i>, to Quantum Group at University of Oxford, Department of Computer Science, July 2020</p> <p><i>Cellular Sheaves and the Tarski Laplacian</i>, SIAM Mathematics of Data Science Conference, May 2020</p> <p><i>Sheaves, Lattices, and Optimization</i>, Electrical and Systems Engineering PhD Colloquium, University of Pennsylvania, March 2019</p> <p><i>Persistence: Parameterized Homology and Homotopy</i>, Geometry and Topology Seminar, University of Pennsylvania, April 2019</p> <p><i>Realization Problems in Persistent Homology</i>, Undergraduate Geometry and Topology Conference, University of Texas at Austin, February 2016</p>

Teaching            Teaching Assistant to Robert Ghrist, *Video Production for Mathematics*, Fall 2021

Teaching Assistant to Santosh Venkatesh, *Introduction to Probability and Statistics*, Summer 2018

Academic Service    Reviewer, *NeurIPS Workshop*, 2020

Reviewer, *IEEE Transactions on Automatic Control*, 2020

Organizer, *GRASP Game Theory Seminar*, Summer 2020

Organizer, *Graduate Research Seminar in Applied Topology*, July 2018 – July 2019

Volunteer, *Duke Alumni Admissions Advisory Committee (AAAC)*, January 2018 – February 2021

Workshops  
Participated

*NeurIPS 2020 Workshop on Topological Data Analysis and Beyond*, Virtual, December 2020

*NSF-CBMS Conference on Topological Methods in Machine Learning and Artificial Intelligence*, College of Charleston, May 2019

*Tutorial on Multiparameter Persistence, Computation, and Applications*, Institute for Mathematics and its Applications (IMA), August 2018

*Bridging Sheaves and Statistics*, IMA, May 2018

Coding

Python	●●●●●	SQL	●●●●●
MATLAB	●●●●●	JavaScript	●●●●●
Julia	●●●●●	Coq	●●●●●
Haskell	●●●●●		
C	●●●●●		

References

*Robert Ghrist* (doctoral adviser)  
Andrea Mitchel Penn Integrates Knowledge Professor  
University of Pennsylvania  
ghrist@math.upenn.edu

*George Pappas*  
UPS Foundation Professor  
University of Pennsylvania  
pappasg@seas.upenn.edu

*Alejandro Ribeiro*  
Professor  
University of Pennsylvania  
aribeiro@seas.upenn.edu