

Jisu KIM

Curriculum Vitae

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Academic Positions

Nov 2018 – **PostDoc**, *DataShape*, *Inria Saclay*, Palaiseau, France.
Present

Education

Aug 2013 – **Ph.D. in Statistics & Machine Learning**, *Carnegie Mellon University*, Pittsburgh, United States of America.
Dec 2018
Advisor: Larry Wasserman and Alessandro Rinaldo
Thesis: Statistical Inference For Geometric Data [slides | paper]

Aug 2013 – **M.S. in Statistics**, *Carnegie Mellon University*, Pittsburgh, United States of America.
May 2014

Mar 2006 – **B.S. in Mathematics, Computer Science, Statistics**, *Seoul National University*, Seoul, Republic of Korea.
Aug 2013
Graduated Summa Cum Laude (first honors in College of Natural Science)

Papers

Kwangho Kim, Edward H. Kennedy, Jisu Kim, Larry Wasserman, Causal Clustering

Jaehyeok Shin, Jisu Kim, Alessandro Rinaldo, Larry Wasserman, Persistent homology of density filtration on rips complex

Kwangho Kim, Jisu Kim, Barnabás Póczos, Distribution Regression in Semi-supervised Learning

2019 Jisu Kim, Jaehyeok Shin, Alessandro Rinaldo, Larry Wasserman, Uniform Convergence Rate of the Kernel Density Estimator Adaptive to Intrinsic Volume Dimension
To appear in Thirty-sixth International Conference on Machine Learning (ICML 2019).
[arXiv | BibTeX]

2019 Jisu Kim, Jaehyeok Shin, Alessandro Rinaldo, Larry Wasserman, Nerve Theorem on a Positive Reach set
[arXiv | BibTeX]

- 2019 Eddie Aamari, Jisu Kim, Frédéric Chazal, Bertrand Michel, Alessandro Rinaldo, Larry Wasserman, Estimating the Reach of a Manifold
Appeared in *Electronic Journal of Statistics*, Volume 13, Number 1.
[[arXiv](#) | [Electronic Journal of Statistics](#) | [HAL](#) | [BibTeX](#)]
- 2019 Jisu Kim, Alessandro Rinaldo, Larry Wasserman, Minimax Rates for Estimating the Dimension of a Manifold
Appeared in *Journal of Computational Geometry*, Volume 10, Number 1.
[[arXiv](#) | [Journal of Computational Geometry](#) | [BibTeX](#)]
- 2018 Kwangho Kim, Jisu Kim, Alessandro Rinaldo, Time Series Featurization via Topological Data Analysis: an Application to Cryptocurrency Trend Forecasting
[[arXiv](#) | [BibTeX](#)]
- 2018 Kwangho Kim, Jisu Kim, Edward H. Kennedy, Causal effects based on distributional distances
[[arXiv](#) | [BibTeX](#)]
- 2018 Kijung Shin, Jisu Kim, Bryan Hooi, Christos Faloutsos, Think before You Discard: Accurate Triangle Counting in Graph Streams with Deletions
Appeared in *The European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2018 (ECML-PKDD 2018)*.
[[paper](#) | [appendix](#) | [www \(code and datasets\)](#) | [BibTeX](#)]
- 2017 Kijung Shin, Bryan Hooi, Jisu Kim, Christos Faloutsos, DenseAlert: Incremental Dense-Subtensor Detection in Tensor Streams
Appeared in *The 23rd SIGKDD Conference on Knowledge Discovery and Data Mining*.
[[paper](#) | [appendix](#) | [www \(code and datasets\)](#) | [BibTeX](#)]
- 2017 Kijung Shin, Bryan Hooi, Jisu Kim, Christos Faloutsos, D-Cube: Dense-Block Detection in Terabyte-Scale Tensors
Appeared in *The 10th ACM International Conference on Web Search and Data Mining (WSDM 2017)*.
[[paper](#) | [appendix](#) | [www \(code and datasets\)](#) | [BibTeX](#)]
- 2017 Jisu Kim, Yen-Chi Chen, Sivaraman Balakrishnan, Alessandro Rinaldo, Larry Wasserman, Statistical Inference for Cluster Trees
Appeared in *Advances in Neural Information Processing Systems 29 (NIPS 2016)*.
[[arXiv](#) | [NIPS](#) | [BibTeX](#)]
- 2014 Brittany T. Fasy, Jisu Kim, Fabrizio Lecci, Clement Maria, David L. Millman, Vincent Rouvreau, Introduction to the R package TDA.
[[arXiv](#) | [BibTeX](#)]

Talks

- 2019-02-25 **R Package TDA for Statistical Inference on Topological Data Analysis**, *Recent Progresses in Data Analysis - Part I of II in SIAM Conference on Computational Science and Engineering*, Spokane, USA.
[slides | tutorial | code | abstract]
- 2018-10-29 **Persistent homology of kernel density estimator filtration on Rips complex**, *Institut Henri Poincaré seminar*, Paris, France.
[slides]
- 2018-10-11 **R Package TDA for Statistical Inference on Topological Data Analysis and Lessons from its Maintenance**, Pittsburgh, USA.
[slides | tutorial | code]
- 2018-06-13 **R Package TDA for Topological Data Analysis**, *Educational Forum on the Teaching of Computational Geometry and Topology: Some History, Current Practice, and Future Trends in The 34th International Symposium on Computational Geometry*, Budapest, Hungary.
[slides | tutorial | code]
- 2018-03-10 **Estimating the Reach of a Manifold**, *42nd SIAM Southeastern Atlantic Sectional Conference*, Chapel Hill, USA.
- 2017-12-09 **Introduction to the R package TDA**, *Synergies in Geometric Data Analysis in Advances in Neural Information Processing Systems 30 (NIPS 2017)*, Long Beach, USA.
[slides | tutorial | code]
- 2017-05-08 **Statistical inference on persistent homology of density filtration on Rips complex**, *Topological Methods in Brain Network Analysis*, Banff, Canada.
[slide | video]
- 2017-05-08 **R Package TDA for Statistical Inference on Topological Data Analysis**, *Topological Methods in Brain Network Analysis*, Banff, Canada.
[slide | tutorial | code | video]
- 2017-01-04 **Statistical Inference on Topological Data Analysis**, *AMS Special Session on Statistical Methods in Computational Topology and Applications in 2017 Joint Mathematics Meetings*, Atlanta, USA.
[slides | abstract]
- 2016-06-16 **R Package TDA for Statistical Inference on Topological Data Analysis**, *5th Mini Symposium on Computational Topology in The 32nd International Symposium on Computational Geometry*, Boston, USA.
[slides | abstract]

- 2015-11-14 **Minimax Rate for Estimating the Dimension of a Manifold**, *Special Session on Topological Data Analysis: Computations, Statistics, and Applications in AMS Fall Eastern Sectional Meeting*, New Brunswick, USA.
[slides | abstract]
- 2015-07-27 **Minimax Rate for Dimension Estimator**, *The 60th ISI World Statistics Congress*, Rio de Janeiro, Brazil.
[slides]
- 2015-06-23 **Tutorial on the R Package TDA**, *The 4th Annual Minisymposium on Computational Topology in The 31st International Symposium on Computational Geometry*, Eindhoven, Netherlands.
[slides | tutorial | code]
- 2015-05-28 **Minimax Rate for Estimating the Dimension of a Manifold**, *TopData in Inria Geometrica*, Palaiseau, France.
[slides]

Posters

- 2019-01-08 **Persistent homology of KDE filtration on Rips complex**, *Workshop on Applied Topology 2019*, Kyoto, Japan.
[poster | abstract]
- 2017-07-30 **R Package TDA for Statistical Inference on Topological Data Analysis**, *Joint Statistical Meetings 2017*, Baltimore, USA.
[poster | abstract]
- 2017-05-19 **Estimating the Reach of a Manifold**, *UC Davis RTG Statistical Sciences Symposium: Geometry, Statistics and Data Analysis*, Davis, USA.
[poster]
- 2017-04-04 **R Package TDA: Statistical Tools for Topological Data Analysis**, *ASA Pittsburgh Chapter Spring Banquet*, Pittsburgh, USA.
[poster]
- 2016-12-06 **Statistical Inference for Cluster Trees**, *Advances in Neural Information Processing Systems 29 (NIPS 2016)*, Barcelona, Spain.
[poster]
- 2016-05-16 **Minimax Reach Estimator**, *Topology, Geometry, and Data Analysis Conference at OSU*, Columbus, USA.

Software

- R package TDA: Statistical Tools for Topological Data Analysis
- Authors: Brittany Terese Fasy, Jisu Kim, Fabrizio Lecci, Clément Maria, Vincent Rouvreau
 - [CRAN | Reference Manual | Vignettes]

Teaching

- Fall 2013 – **TA**, *Carnegie Mellon University*, Pittsburgh, United States of America.
 Spring 2018
- Advanced Probability Overview [Spring 2018]
 - Advanced Statistical Theory I [Fall 2017, Fall 2016]
 - Statistical Machine Learning [Spring 2017, Spring 2016, Spring 2015]
 - Introduction to Statistical Inference [Summer 2016]
 - Intermediate Statistics [Fall 2015, Fall 2014]
 - Advanced Methods for Data Analysis [Spring 2014]
 - Probability and Mathematical Statistics 1 [Fall 2013]
- Spring 2008 – **tutor**, *Seoul National University*, Seoul, Republic of Korea.
 Fall 2012
- Basic calculus 2 [Fall 2012, Fall 2008]
 - Basic calculus 1 [Spring 2012, Spring 2008]

Experience

- Summer 2015 **Intern**, *Inria Geometrica*, Palaiseau, France.
 advised by Frédéric Chazal and Bertrand Michel
- Winter 2012 **Undergraduate Research Internship Program**, *Seoul National University*, Seoul, Republic of Korea.
 advised by Yongdai Kim
- Summer 2012, Winter 2011 **Undergraduate Research Internship Program**, *Seoul National University*, Seoul, Republic of Korea.
 advised by Seonhee Lim
- Sep 2009 – Jul 2011 **Sergeant**, *Republic of Korea Army*, Republic of Korea.
 specialty : Computer technician
- Jan 2009 – Jun 2009 **Analyzer**, *Allm*, Seoul, Republic of Korea.

Awards and Honors

- 2013 – 2018 Samsung Scholarship (for Doctoral degree)
- 2017 TA of the Year Award, by Department of Statistics
- 2017 Student of the year for 2017, by the American Statistical Association
 Pittsburgh Chapter
- 2016 α TA Award, by Machine Learning Department, Carnegie Mellon
 University

Autumn 2013 Graduated first honors in College of Natural Sciences
Fall 2012, Dean's list
Spring 2012,
Fall 2011
2006 – 2012 National Presidential Science Scholarship (for undergraduate) by Korean Student Aid Foundation
2011 1st prize, The 30th University Students Contests of Mathematics, by Korean Math Society
2011 2nd place, ACM-ICPC Asia-Daejeon Regional 2011
2008, 2007 Annual Honor Reward
2008 2nd prize, The 27th University Students Contests of Mathematics, by Korean Math Society
2005 Gold prize, 19th Korean Mathematical Olympiad, by Korean Math Society

Language

Natural language Korean(native), English
Computer language C++, R, Matlab, C, Ocaml, LATEX, Python, Scheme, SAS, Java, Fortran