

# Jaehyeok Shin

Email: [shinjaehyeok@cmu.edu](mailto:shinjaehyeok@cmu.edu)

Web: <https://www.stat.cmu.edu/~jaehyeos/>

## RESEARCH SUMMARY

---

My research interest lies in understanding the sequential and adaptive nature of data analysis. I study how commonly used statistical inference procedures behave under the presence of an analyst's data-dependent choices. My current projects focus on designing and analyzing nonasymptotic sequential testings and online change-point detection procedures.

During the Ph.D., my thesis's focus was to qualitatively and quantitatively measure the selection bias caused by different sorts of human interventions in settings of adaptive experimentation like multi-armed bandits, advised by [Aaditya Ramdas](#) and [Alessandro Rinaldo](#). I have also worked extensively with [Larry Wasserman](#) to understand the geometrical and topological structure of data-generating processes.

**Keywords:** Anytime-valid inference, Sequential test, Multi-armed bandit, Change-point detection

## ACADEMIC APPOINTMENT

---

July 2020 - **Postdoctoral Researcher**,  
Present Carnegie Mellon University, Department of Statistics

December 2013 - **Statistical Consultant - Part Time**,  
December 2014 SNU Statistical Research Institute

## EDUCATION

---

May 2020 **Ph.D. in Statistics**, Carnegie Mellon University

February 2015 **M.S. in Statistics**, Seoul National University

February 2013 **B.S. in Mathematical Sciences**, Seoul National University

## PUBLICATIONS

---

**2020** On conditional versus marginal bias in multi-armed bandits  
J. Shin, A. Ramdas, A. Rinaldo  
*Thirty-seventh International Conference on Machine Learning (ICML 2020)*

**2020** Homotopy Reconstruction via the Cech Complex and the Rips Complex  
J. Kim, J. Shin, F. Chazal, A. Rinaldo, L. Wasserman  
*Symposium on Computational Geometry (SoCG 2020)*

**2019** Are sample means in multi-armed bandits positively or negatively biased?  
J. Shin, A. Ramdas, A. Rinaldo  
*Neural Information Processing Systems (NeurIPS 2019, Spotlight)*

**2019** Uniform Convergence Rate of the Kernel Density Estimator Adaptive to Intrinsic Dimension.  
J. Kim, J. Shin, A. Rinaldo, L. Wasserman  
*Thirty-sixth International Conference on Machine Learning (ICML 2019)*

## PREPRINTS

---

- (arXiv) Nonparametric iterated-logarithm extensions of the sequential generalized likelihood ratio test  
J. Shin, A. Ramdas, A. Rinaldo  
*Submitted to IEEE Journal on Selected Areas in Information Theory*
- (arXiv) On the bias, risk and consistency of sample means in multi-armed bandits  
J. Shin, A. Ramdas, A. Rinaldo  
*Submitted to SIAM Journal on Mathematics of Data Science*
- (arXiv) Predictive clustering  
J. Shin, A. Rinaldo, L. Wasserman  
*Submitted to Electronic Journal of Statistics*

## PRESENTATIONS

---

- 2020 On conditional versus marginal bias in multi-armed bandits (ICML 2020)  
2019 Are sample means in multi-armed bandits positively or negatively biased? (NeurIPS 2019, Spotlight)  
2018 Persistent homology of KDE filtration on Rips complex (SIAM-SEAS 2018)  
2017 Persistent homology of KDE filtration on Rips complex (NIPS 2017 Workshop)

## PEER REVIEW SERVICE

---

- Neural Information Processing Systems (2020)  
Conference on Algorithmic Learning Theory (2020)  
Conference on Learning Theory (2019)

## EXPERIENCE

---

- 2015 - 2019 **Teaching Assistant**, Carnegie Mellon University  
- Advanced Statistical Theory I, Spring 2019  
- Advanced Statistical Theory, Fall 2018  
- Advanced Methods for Data Analysis, Spring 2018  
- Modern Regression, Fall 2017  
- Special Topics: Data Mining, Spring 2017  
- Modern Regression, Fall 2016  
- Advanced Methods for Data Analysis, Spring 2016  
- Introduction to Probability Theory, Fall 2015
- 2013 - 2014 **Teaching Assistant**, Seoul National University  
- Statistics, Fall 2014  
- Mathematical Statistics 2, Fall 2013  
- Statistics, Spring 2013
- 2014 **Statistical Consulting**, SNU Statistical Research Institute  
- Analyzed risk factors for failure of cataract surgery in dogs  
- Develop a statistical model to predict future water pipe ruptures in Seoul
- Spring 2011 **Undergraduate Tutor**, Seoul National University