

# Beomseok Seo

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## CONTACT INFORMATION

Statistical Research Team, Bank of Korea,  
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<https://seo-beomseok.github.io>

## EDUCATION

**Penn State University**, University Park, PA  
*Ph.D.*, Statistics (GPA 3.88/4.00)

Aug 2016 - Aug 2021

- Advisor: Jia Li and Lynn Lin

- Thesis: Interpretable Statistical Learning: From Hidden Markov Models to Neural Networks.

**Korea University**, Seoul, Korea

Mar 2005 - Feb 2011

*B.S.*, Economics & Statistics

(GPA 4.23/4.50, STAT 4.46, ECON 4.22)

## RESEARCH INTERESTS

My research interests include interpretable statistical modeling and machine learning for the better human understanding and human-machine interaction, developing validation tools for machine learning models in perspective of business and human analytics, natural language text mining, etc.

## PEER- REVIEWED JOURNAL ARTICLES

\* Corresponding author

**Beomseok Seo\***, Lynn Lin, Jia Li (2022+) "Mixture of Linear Models Co-supervised by Deep Neural Networks." Journal of Computational and Graphical Statistics  
Accepted

**Beomseok Seo\***, Lynn Lin, Jia Li (2021). "Block-wise Variable Selection for Clustering via Latent States of Mixture Models." Journal of Computational and Graphical Statistics, 1-13. Published

Jia Li, **Beomseok Seo**, Lynn Lin (2019) "Optimal Transport, Mean Partition, and Uncertainty Assessment in Cluster Analysis." Statistical Analysis and Data Mining: The ASA Data Science Journal 12.5: 359-377 Published

**Beomseok Seo\***, Jia Li (2022+) "SEE-Net: Synced and Explanation-Enhanced Neural Network." Will be submitted soon

**Beomseok Seo** (2022+) "Cohort Analysis for Homogeneous Consumption Behavior Using Explainable Neural Network" In progress

**Beomseok Seo** (2022+) "Information Extraction from Ubiquitous Text Data for Text-enhanced Now-casting." In progress

**Beomseok Seo**, Jia Li (2022+) "EM Algorithm for Parametric Approximation of Neural Networks." In progress

Yuling Chang, **Beomseok Seo** (2022+) "Using Explainable AI to Envision the Future of Work, Workers, and Workplace." In progress

## CONFERENCE PROCEEDINGS & WORKING PAPERS

**Beomseok Seo** (2021) "Interpretable Statistical Learning: From Hidden Markov Models to Neural Networks", Penn State University Ph.D Dissertation, State College, PA.

Younghwan Lee, **Beomseok Seo** (2022) "Extracting Economic Sentiment from News Articles: The Case of Korea.", Irving Fisher Committee on Central Bank Statistics (IFC) Conference 2022, Italy.

Seungjun Shin, **Beomseok Seo**, Jeongeun Sim, Heejun Kim (2022+) "Real-time Consumption Prediction Method Using Big-data", Bank of Korea Research Paper, Seoul. In progress

**Beomseok Seo**, Younghwan Lee, Hyungbae Cho (2022+) "News Sentiment Index (NSI): Method and Impact", Bank of Korea National Account Review, Seoul. In progress

## CONFERENCE TALKS

*Bank of Korea Statistics Forum 2021*, Seoul Nov 2021  
Cohort Analysis for Homogeneous Consumption Behavior Using Explainable Neural Network, Invited talk

*The Korean Statistical Society Conference (TKSS) 2021*, Seoul Nov 2021  
Mixture of Linear Models Co-supervised by Deep Neural Networks, Invited talk

*Ewha Womans University Dept. of Statistics 2021*, Seoul Oct 2021  
Mixture of Linear Models Co-supervised by Deep Neural Networks, Invited talk

*Computational and Financial Econometrics 2019*, London Dec 2019  
Optimal transport, mean partition, and uncertainty assessment in cluster analysis, Invited talk

*Joint Statistical Meetings(JSM) 2019*, Denver Jul 2019  
Variable Selection via Semi-Clusters for Mixture-Model-Based Clustering, Contributed talk

*Joint Statistical Meetings(JSM) 2018*, Vancouver Jul 2018  
Optimal transport, mean partition, and uncertainty assessment in cluster analysis, Contributed talk

*50th Anniversary Conference of the Statistics Dept.*, State College May 2018  
Optimal transport, mean partition, and uncertainty assessment in cluster analysis, Contributed talk

*5th National Statistics Development Forum*, Seoul May 2015  
Fitting the Gross Domestic Expenditure (GDP), Contributed talk

## TEACHING EXPERIENCE

**Penn State University**, State College, PA

- *Instructor, Dept. of Statistics*
  - STAT200, Elementary Statistics, Summer 2019, Summer 2021
  - STAT418, Introduction to Probability and Stochastic Processes, Spring 2020
- *Teaching Assistant, Dept. of Statistics*

- STAT557, Data Mining, Fall 2018
- STAT561, Statistical Inference, Spring 2019
- STAT511, Regression analysis, Spring 2017
- STAT510, Applied time Series analysis, Fall 2019, Fall 2020
- STAT485, Intermediate topics in R statistical language, Fall, Summer 2017
- STAT418, Introduction to probability and Stochastic Process, Fall 2016, Spring 2017
- STAT401, Experimental methods, Spring 2018

## WORK EXPERIENCE

### **The Bank of Korea**, Seoul, Korea

- *Statistics Research Team, Economist* *Jun. 2021 - Present*
  - Modeling of text data and developing new statistical indices: news sentiment index, economic policy uncertainty index, etc.; Modeling real time consumption
- *Economic Statistics Department, Junior Economist* *Feb 2013 - Jun 2016*
  - Time series modeling and forecasting gross domestic products (GDP); Automating and programming the compilation of goods and services of exports and imports in GDP.
- *Financial Markets Department, Junior Economist* *Jan 2011 - Feb 2013*
  - Time series modeling and volatility analysis of short term financial markets

### **Pennsylvania State University**, State College, PA

- *Dept. of Statistics, Research Assistant* *June 2018, June 2020, & January 2021*
  - High-dimensional Unsupervised Learning Problems, Supervised by Jia Li
  - Interpretable Neural Network Models, Supervised by Lynn Lin
- *Smeal College of Business, Research Assistant* *July 2020*
  - Neural Networks for Longitudinal Data, Supervised by Lei Wang
- *Dept. of Political Science, Research Assistant* *June 2017*
  - Misclassified Event-Failure Models, Supervised by Bumba Mukherjee

### **Korea Army**, Paju, Korea

Aug 2006 - Jul 2008

## TRAINING

- *Advanced Mathematics Program of The Bank of Korea Academy*, Seoul  
Stochastic Process, Real Analysis, Differential Equations Mar 2012 - Dec 2015
- *Summer School, Barcelona Graduate School of Economics*, Barcelona  
Time Series Vector Auto Regressive Models Jul 2014
- *Singapore Regional Training Institute, IMF*, Singapore  
Modeling for Financial Markets and Instruments Dec 2012

## LANGUAGES

Python/Tensorflow/Konlpy, R, SQL, SAS (comfortable), C/C++, Flutter (limited)

## AWARDS

2018, *The Best Poster Award* of The Statistics Dept. at Penn State Univ.  
2016, *Graduate Study Fellowships* of The Bank of Korea  
2010, *Best Honors Scholarship* in Korea University  
2006-2010, *Honors Scholarship* in Korea University  
2005, *Ansan City Honors Scholarship* from Ansan city in Korea

## SELECTED COURSEWORK

### **Penn State University**

Data Mining I, II (STAT557, IST558), Hierarchical Algorithm and Deep Learning (MATH597), Foundations of Deep Learning (IST597), Statistical Computing (STAT540), Probability Theory (STAT517), Theory of Statistics I, II (STAT513, 514), Asymptotic Tools (STAT553), Stochastic Processes and Monte Carlo Methods (STAT515), Regression Analysis and Modeling (STAT511), Design and Analysis of Experiments (STAT512), Spatial Models (STAT597), Linear Models (STAT580).

### **Korea University**

Topics in Mathematical Statistics (STAT 412), Multivariate Statistical Analysis (STAT401), Computational Statistics (STAT321), Time series Analysis (STAT302), Regression Analysis (STAT342), Sampling Theory (STAT311), Econometrics I, II (ECON301, 242), Financial Economics (ECON354), Economics of Strategy and Information (ECON 324), Micro and Macro Economics (ECON201, 202).