

Woojae Kim

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Permanent Resident of the United States

EDUCATION

Ph.D., Ohio State University, Columbus, OH 2007
Major: Quantitative Psychology (Department of Psychology)
Minor: Statistics (Department of Statistics)
Co-advisors: Jay I. Myung, Ph.D. & Mark A. Pitt, Ph.D.
Dissertation: *Understanding the Connectionist Modeling of Quasiregular Mappings in Reading Aloud*

M.A., Ohio State University, Columbus, OH 2002
Major: Quantitative Psychology (Department of Psychology)
Advisor: Jay I. Myung, Ph.D.
Thesis: *Applications of Markov Chain Monte Carlo in MDL-Based Model Selection*

B.A., Seoul National University, Seoul, Korea 1998
Major: Education

EMPLOYMENT HISTORY

Assistant Professor, Howard University, Department of Psychology 2015–Present

Research Scientist, Ohio State University, Department of Psychology 2011–2015

Manager, Research & Education Team, EduCherry Donga Inc.,
Seoul, Korea 2010–2011

Post-doctoral Research Fellow, Indiana University 2007–2009
Co-advisors: Dr. Jerome Busemeyer & Dr. Richard Shiffrin

Statistical Consultant, Ohio State University, Department of Psychology 2005–2006

RESEARCH INTERESTS

Quantitative / Mathematical Psychology

Bayesian Methods, Computational Cognition, Optimal Experimental Design, Statistical Model Selection, Neural Networks

GOOGLE SCHOLAR CITATION DATA

Citation count: 807
h-index: 8
i10-index: 8
URL: <https://scholar.google.com/citations?user=NTYc27IAAAAJ&hl=en>

RESEARCH GRANTS

National Science Foundation (BCS-1834323; co-funded by the Methodology, Measurement, and Statistics [MMS] and Perception, Action, and Cognition [PAC] programs). Title: *Toward a General Framework for Optimal Experimentation in Computational Cognition*. Amount: \$299,794. **Role: PI** (sole investigator). 2018–2020.

National Institute of Mental Health (under review). Title: *Improving Child Mental Health Service Utilization in Ibadan Nigeria Using a Community Based Participatory Research Approach*. Amount: \$329,019. **Role: Co-I** (PI: Ezer Kang).

PEER REVIEWED JOURNAL PUBLICATIONS

Kim, W., Pitt, M.A., Lu, Z.-L., & Myung, J. I. (2017). Planning beyond the next trial in adaptive experiments: A dynamic programming approach. *Cognitive Science*, 41(8), 2234–2252.

Steege, S., Kim, W., Pestman, W., Tuerlinckx, F., & Vanpaemel, W. (2017). A theoretical note on the prior information criterion. *Journal of Mathematical Psychology*, 80, 33–39.

Armstrong, B. C., Dumay, N., Kim, W., & Pitt, M. A. (2017). Generalization from newly learned words reveals structural properties of the human reading system. *Journal of Experimental Psychology: General*, 146(2), 227–249.

Hou, F., Lesmes, L. A., Kim, W., Gu, H., Pitt, M. A., Myung, J. I., & Lu, Z.-L. (2016). Evaluating the performance of the quick CSF method in detecting contrast sensitivity function changes. *Journal of Vision*, 16(6):18, 1–19.

Gu, H., Kim, W., Hou, F., Lesmes, L. A., Pitt, M. A., Lu, Z.-L., & Myung, J. I. (2016). A hierarchical Bayesian approach to adaptive vision testing: A case study with the contrast sensitivity function. *Journal of Vision*, 16(6):15, 1–17.

Kim, W., Pitt, M. A., Lu, Z.-L., Steyvers, M., & Myung, J. I. (2014). A hierarchical adaptive approach to optimal experimental design. *Neural Computation*, 26(11), 2465–2492.

Kim, W., Pitt, M. A., & Myung, J. I. (2013). How do PDP models learn quasiregularity? *Psychological Review*, 120(4), 903–916.

Lodewyckx, T., Kim, W., Lee, M. D., & Wagenmakers, E.-J. (2011). A tutorial on Bayes factor estimation with the product space method. *Journal of Mathematical Psychology*, 55, 331–347.

Ahn, W. Y., Krawitz A., Kim, W., Busemeyer, J. R., & Brown, J. W. (2011). A model-based fMRI analysis with hierarchical Bayesian parameter estimation. *Journal of Neuroscience, Psychology, and Economics*, 4(2), 95–110.

Fridberg, D.J., Queller, S., Ahn, W.Y., Kim, W., Bishara, A.J., Busemeyer, J.R., Porrino, L., & Stout J.C. (2010). Cognitive mechanisms underlying risky decision-making in chronic cannabis users. *Journal of Mathematical Psychology*, 54(1), 28–38.

Shiffrin, R. M., Lee, M. D., Kim, W., & Wagenmakers, E.-J. (2008). A survey of model evaluation approaches with a tutorial on hierarchical Bayesian methods. *Cognitive Science*, 32(8), 1248–1284.

Pitt, M. A., Kim, W., Navarro, D. J., & Myung, J. I. (2006). Global model analysis by parameter space partitioning. *Psychological Review*, 113(1), 57–83.

Pitt, M. A., Kim, W., & Myung, I. J. (2003). Flexibility vs generalizability in model selection. *Psychonomic Bulletin & Review*, 10, 29-44.

PEER REVIEWED CONFERENCE PAPERS

Kim, W., Pitt, M. A., Lu, Z.-L., M., Steyvers, M., Gu, H., & Myung, J. I. (2014). A hierarchical adaptive approach to the optimal design of experiments. In P. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 749-754). Austin, TX: Cognitive Science Society.

Kim, W., Navarro, D. J., Pitt, M. A. & Myung, I. J. (2004). An MCMC-based method of comparing connectionist models in cognitive science. *Advances in Neural Information Processing Systems*, vol. 16. Cambridge, MA: MIT Press.

Navarro, D. J., Myung, I. J., Pitt, M. A., & Kim, W. (2003). Global model analysis by landscaping. In R. Alterman & D. Kirsh (Eds.), *Proceedings of the 25th Annual Meeting of the Cognitive Science Society*, CD-ROM format, (Boston, MA: August, 2003).

BOOK CHAPTERS

Myung, I. J., Pitt, M. A., & Kim, W. (2005). Model evaluation, testing and selection. In K. Lambert and R. Goldstone (eds.), *The Handbook of Cognition*. Thousand Oaks, CA: Sage.

MANUSCRIPTS IN PROGRESS

Kim, W. Adome: A Python package for adaptive design optimization of model-based experimentation.

Kim, W. A psychometric function smackdown: Is the Bayesian optimal procedure superior to the simple staircasing?

Kim, W., Pitt, M. A. & Myung, I. J. Bayesian adaptive estimation of stop-signal reaction time distributions.

Kim, W. & Hill, R. Modeling common factors of frequency-based response scales.

Kim, W. Bayesian comparison of cognitive models via sequential Monte Carlo sampling.

INVITED PRESENTATIONS

Kim, W. (May, 2016). Multivariate Research Methods and Statistics. Invited as a co-leader of the workshop funded by Educational Testing Service at the *NAEP-Howard Statistics and Evaluation Institute, Howard University*, Washington D.C.

Kim, W. (July, 2015). Dynamic programming: Planning beyond the next trial in adaptive experiments. Invited presentation at *CogSci 2015 Workshop on Optimizing Experimental Designs: Theory, Practice, and Applications*, 37th Annual Meeting of the Cognitive Science Society, Pasadena, CA.

Kim, W. (October, 2014). How Do PDP Models Learn Quasiregularity? Invited presentation at *Department of Psychology, Seoul National University*, Seoul, Korea.

Kim, W. (January, 2011). Bayesian Data Analysis Using WinBUGS. Invited tutorial presentation at *Department of Psychology, Seoul National University*, Seoul, Korea.

Kim, W. (October, 2010). Towards Better Methods of Evaluating Theoretical Explanations of Data in Cognitive Science. Invited presentation at *Interdisciplinary Cognitive Science Program, Seoul National University*, Seoul, Korea.

- Kim, W. (July, 2009). Introduction to Mathematical Psychology. Invited presentation at *Department of Psychology, Yonsei University*, Seoul, Korea.
- Kim, W. (July, 2009). Model Selection Problems in Statistical Techniques. Invited presentation at *Department of Psychology, Yonsei University*, Seoul, Korea.
- Kim, W. (June, 2008). Using WinBUGS for Bayes Factor Calculation. Invited tutorial presentation at *Department of Psychology, Ohio State University*, Columbus, Ohio.
- Kim, W., Pitt, M. A., Navarro, D., & Myung, I. J. (May, 2006). Parameter Space Partitioning: A Method of Global Model Analysis. Invited presentation at *Department of Psychological & Brain Sciences, Indiana University*, Bloomington, Indiana.

CONFERENCE PRESENTATIONS

- Kim, W., Pitt, M. A., & Myung, I. J. (2018). Fully adaptive estimation of stop-signal reaction-time distributions. Paper presented at the Annual Mathematical Psychology Meeting, Madison, WI.
- Kim, W., Pitt, M. A., Lu, Z.-L., & Myung, I. J. (2017). Planning beyond the Next Trial in Adaptive Experiments: A Dynamic Programming Approach. Paper presented at the Annual Mathematical Psychology Meeting, Coventry, UK.
- Hou, F., Lesmes, L., Kim, W., Gu, H., Pitt, M. A., Myung, I. J., & Lu, Z.-L. (2017). Predicting the Contrast Sensitivity Function in Different Luminance Conditions. Poster presented at the Annual Meeting of the Association for Research in Vision and Ophthalmology, Baltimore, MD.
- Myung, I. J., Kim, W., Gu, H., Lu, Z.-L., & Pitt, M. A. (2016) A Hierarchical Bayesian Approach to Adaptive Design Optimization. Paper presented at the 57th Annual Meeting of the Psychonomic Society, Boston, MA.
- Armstrong, B. C., Dumay, N., Kim, W., & Pitt, M. A. (2016). Generalization from newly learned words reveals structural properties of the human reading system. Paper presented at the 57th Annual Meeting of the Psychonomic Society, Boston, MA.
- Kim, W., Pitt, M. A., & Myung, I. J. (2015). Optimizing the efficiency of estimating stop-signal reaction time distributions via Bayesian adaptive experimentation. Poster presented at the Annual Meeting of the Psychonomic Society, Chicago, IL.
- Kim, W., Pitt, M. A., & Myung, I. J. (2015). Estimating stop-signal reaction time distributions via Bayesian adaptive experimentation. Paper presented at the Annual Mathematical Psychology Meeting, Newport Beach, CA.
- Gu, H., Kim, W., Hou, F., Lu, Z.-L., Pitt, M. A., & Myung, I. J. (2015). Hierarchical Adaptive Estimation of the Contrast Sensitivity Function (CSF): Part I Effect of Sample Size. Poster presented at the Annual Meeting of the Association for Research in Vision and Ophthalmology, Denver, Colorado.
- Pitt, M. A., Gu, H., Hou, F., Kim, W., Lu, Z.-L., & Myung, I. J. (2015). Hierarchical Adaptive Estimation of the Contrast Sensitivity Function (CSF): Part II Effect of Type of Prior. Poster presented at the Annual Meeting of the Association for Research in Vision and Ophthalmology, Denver, Colorado.
- Hou, F., Lesmes, L., Kim, W., Gu, H., Pitt, M. A., Myung, I. J., & Lu, Z.-L. (2015). Evaluating the sensitivity of the quick CSF method for detecting changes in contrast sensitivity. Poster presented at the Annual Meeting of the Association for Research in Vision and Ophthalmol-

ogy, Denver, Colorado.

- Lu, Z.-L., Hou, F., Lesmes, L., Kim, W., Gu, H., Pitt, M. A., & Myung, I. J. (2015). A large-sample study for evaluating the precision of the quick CSF method. Poster presented at the Annual Meeting of the Association for Research in Vision and Ophthalmology, Denver, Colorado.
- Kim, W., Pitt, M. A., Lu, Z.-L., Steyvers, M., & Myung, I. J. (2014). A hierarchical adaptive approach to the optimal design of experiments. Paper presented at the Annual Meeting of the Cognitive Science Society, Quebec City, Canada.
- Kim, W., Pitt, M. A., Lu, Z.-L., Steyvers, M., & Myung, I. J. (2014). A hierarchical adaptive approach to the optimal design of experiments. Paper presented at the Annual Mathematical Psychology Meeting, Quebec City, Canada.
- Kim, W., Pitt, M. A., Lu, Z.-L., Steyvers, M., & Myung, I. J. (2014). A hierarchical adaptive approach to optimal experimental design. Paper presented at the Midwest Cognitive Science Conference, Dayton, OH.
- Kim, W., Pitt, M.A., Lu, Z.-L., & Myung, J. I. (2014). How far can we look ahead in designing our experiment? Paper presented at the 52nd Edwards Bayesian Research Conference, Fullerton, CA.
- Kim, W., Pitt, M. A., & Myung, I. J. (2013). How Do PDP Models Learn Quasiregularity? Poster presented at the Annual Meeting of the Psychonomic Society, Toronto, Ontario, Canada.
- Kim, W., Pitt, M. A., & Myung, I. J. (2013). How Do PDP Models Learn Quasiregularity? Paper presented at the Annual Mathematical Psychology Meeting, Potsdam, Germany.
- Kim, W., Pitt, M. A., & Myung, I. J. (2012). Optimal experimental design for model discrimination: A nonparametric extension. Paper presented at the Annual Mathematical Psychology Meeting, Columbus, OH.
- Kim, W., Pitt, M. A., Myung, I. J., & Steyvers, M. (2012). Optimal experimental design for model discrimination in cognitive science: A nonparametric extension. Paper presented at the World Meeting of International Society for Bayesian Analysis, Kyoto, Japan.
- Kim, W., & Shiffrin R. M. (2009). Incorporating prior beliefs of data into statistical model selection. Paper presented at the Annual Mathematical Psychology Meeting, Amsterdam, Netherlands.
- Ahn, W. Y., Krawitz A., Kim, W., Busemeyer, J. R., & Brown, J. W. (2008). Neural correlates of subjective values: a model-based fMRI study. Paper presented at the Annual Meeting of the Society for Neuroscience, Washington D.C.
- Kim, W., Ahn, W. Y., & Busemeyer, J. R. (2008). Hierarchical Bayesian analysis of cocaine abuser data using the Expectancy-Valence model of Iowa Gambling Task. Paper presented at the Annual Mathematical Psychology Meeting, Washington D.C.
- Kim, W. (2007). Understanding the connectionist modeling of quasi-regular mappings in reading aloud. Paper presented at the Annual Mathematical Psychology Meeting, Irvine, CA.
- Kim, W. & Shiffrin, R. M. (2007). Model Selection under Individual Differences. Poster presented at the Annual Mathematical Psychology Meeting, Irvine, CA.
- Kim, W. & Shiffrin, R. M. (2007). Model Selection with Data under Individual Differences. Paper presented at the Sixth Annual Summer Interdisciplinary Conference, Kalymnos, Greece.

- Kim, W. (2006). How does a distributed connectionist model work?: An analysis of reading network. Paper presented at the Annual Mathematical Psychology Meeting, Vancouver, B.C., Canada.
- Kim, W. (2005). Understanding hidden unit representations in distributed connectionist models. Paper presented at the Annual Mathematical Psychology Meeting, Memphis, TN.
- Kim, W., Pitt, M. A., Navarro, D., & Myung, I. J. (2004). Parameter space partitioning: A method of global model analysis. Paper presented at the Annual Mathematical Psychology Meeting, Ann Arbor, MI.
- Kim, W., Navarro, D., Pitt, M. A., & Myung, I. J. (2003). An MCMC-based method of comparing connectionist models in cognitive science. Paper presented at the 17th Annual Conference of Neural Information Processing Systems, Vancouver & Whistler, Canada.
- Myung, I. J., Kim, W., Navarro, D., & Pitt, M. A. (2003). Model complexity and mimicry: A case study of connectionist models of speech perception. Paper presented at the 2003 Annual Mathematical Psychology Meeting, Ogden, UT.
- Pitt, M. A., Myung, I. J., Navarro, D., & Kim, W. (2003). Landscaping: A method for distinguishing quantitative models. Paper presented at Four Corners Workshop Series in Psycholinguistics, Nijmegen, Netherlands.
- Navarro, D., Myung, I. J., Pitt, M. A., & Kim, W. (2003). Global model analysis by landscaping. Paper presented at the Annual Meeting of the Cognitive Science Society, Boston, MA.
- Kim, W., Pitt, M. A., & Myung, I. J. (2002). Flexibility versus generalizability in model selection. Paper presented at the Annual Mathematical Psychology Meeting, Oxford, OH.
- Kim, W., Myung, I. J., & Pitt, M. A. (2001). MDL Based Model Selection Using Markov Chain Monte Carlo. Paper presentation at the Annual Mathematical Psychology Meeting, Providence, RI.

AWARDS

Fred Brown Research Award, Department of Psychology, *2013–2014*
Ohio State University

The best research paper of the year (for the Psychological Review paper “How do PDP models learn quasiregularity?”)

Fred Brown Research Award, Department of Psychology, *2006–2007*
Ohio State University

The best research paper of the year (for the Psychological Review paper “Global model analysis by parameter space partitioning”)

TEACHING EXPERIENCE & INTERESTS

Courses Taught (at Howard University)

Undergraduate Level

- PSYC 003: Statistics I (Fall 2016, 2017)
- PSYC 004: Statistics II (Spring 2016, 2017; Fall 2017, 2018)

Graduate Level

- PSYC 205: Graduate Research Methods (Fall 2015, 2016; Spring 2018; Fall 2018)

- PSYC 209: Multivariate Statistics (covering up to exploratory factor analysis) (Spring 2016, 2018)
- PSYC 216: Structural Equation Modeling (based on the covariance-based approach) (Spring 2017)

Interested in Teaching

- Introduction to Mathematical Psychology (undergraduate-honor or graduate level)
- Introduction to Cognitive Science—An Interdisciplinary Study of the Mind (undergraduate level)
- Bayesian Statistics (can be adapted for either undergraduate or graduate level)
- Bayesian Cognitive Modeling (undergraduate-honor or graduate level)
- Neural Network Modeling (graduate level)

RESEARCH SUPERVISION

Doctoral Students

- Ricco Hill (2017–present; co-advised with Dr. Jules Harrell)
- Warren Scott (2017–present; co-advised with Dr. Jamie Barden)
- Cassandra Shivers (2016–2018; co-advised with Dr. Angela Cole Dixon)
- Janel Jill (2016–2017; co-advised with Dr. Angela Cole Dixon)

Dissertation/Thesis Committees

- Mary K. Howell (Spring 2018)
- Joshua Johnson (Spring 2018)
- Brianna Brower (Spring 2017)
- Kelsey Ball (Spring 2016)

Undergraduate Students

- Jayda Farmer (2017–present)
- Kandysee Leonard (2017–present)
- Stacia King (2017–present)
- Emi Williams (2017–present)

Statistical Consulting for Dissertation/Thesis Research (alphabetical)

Maxwell Anderson, Imer Arnautovic, Kelsey Ball, Brianna Brower, Mary K. Howell, Arshdeep Kaur, Sharlene Leong, and Clint Walker

DEPARTMENT & UNIVERSITY SERVICE

- Chair of Quantitative Area New Faculty Search Committee (2017–2018; chaired two consecutive search efforts)
- Committee on Graduate Studies (2016–present; prepared and presented plans for PhD Minor in Quantitative Psychology)
- Departmental Assessment Committee (2016–present)
- Cognitive Area New Faculty Search Committee (Spring 2017)

- Proposal committee for a Computational Science Interdisciplinary Studies Major in the College of Arts and Sciences (Spring 2016)

PROFESSIONAL SERVICE

- Ad Hoc Journal Reviewer for *Decision*, *Psychological Review*, *Cognitive Science*, *Behavior Research Methods*, *Journal of Mathematical Psychology*, *Multivariate Behavioral Research*, *Psychonomic Bulletin & Review*, *Scientific Reports*, and *PLOS ONE*
- Ad Hoc Grant Reviewer for *Air Force Office of Scientific Research*, *National Science Foundation*, and *Netherlands Organisation for Scientific Research*
- Grant Review Panelist for *National Science Foundation*
- Reviewer for annual *Intel/Regeneron Science Talent Search* administered by the *Society for Science & the Public* (2015–present)
- Local Organizing Committee for 2014 Asia-Pacific Conference on Computational Behavioral Sciences (APCCBS*2014)

PROFESSIONAL AFFILIATIONS

Society for Mathematical Psychology
Cognitive Science Society
International Society for Bayesian Analysis
Psychonomic Society