Woo-Young Ahn

Contact Information

Department of Psychology
Seoul National University
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Current Research Interests

Broadly I examine the cognitive and neural mechanisms underlying decision-making and self-control. By applying a decision-making framework, I investigate the neural mechanisms underlying psychiatric disorders, especially addictive disorders. I am particularly interested in developing biomarkers of physiological traits and psychiatric disorders to aid the development of diagnostic assessment tools and individual treatment programs. To achieve these goals, I use computational modeling, machine learning techniques, and neuroimaging methods.

Academic Employment

Assistant Professor **September 2017 - Present**
Seoul National University, Department of Psychology

Assistant Professor **August 2015 -August 2017**
The Ohio State University, Department of Psychology
Affiliated Faculty, Translational Data Analytics

Postdoctoral Fellow **October 2014 - July 2015**
Virginia Commonwealth University, Department of Psychiatry
- Institute for Drug and Alcohol Studies
- Advisors: Professors Jasmin Vassileva & F. Gerard Moeller

Postdoctoral Associate **August 2012 - September 2014**
Virginia Tech Carilion Research Institute
- Human Neuroimaging Laboratory & Computational Psychiatry Unit
- Advisors: Professors P. Read Montague & Peter Dayan (University College London)

Education

Ph.D. in Clinical Science **Fall 2006 - August 2012**
Indiana University-Bloomington, Department of Psychological and Brain Sciences
- Advisors: Professors Jerome R. Busemeyer & Brian F. O'Donnell
- Areas of Study: Clinical Science (major) and Cognitive Psychology (minor)

Predoctoral Clinical Internship **July 2011 - June 2012**
University of Illinois at Chicago (UIC), Department of Psychiatry
- Directors: Professors Marc S. Atkins and Susan M. Labott
- Adult Track (APA-Accredited Internship)

M.A. in Clinical Psychology **Feb 2006**
Seoul National University, Department of Psychology
- Advisor: Professor Seok-Man Kwon
- Area of Study: Clinical Psychology

S.M. in Applied Physics **June 2003**
Harvard University, School of Engineering and Applied Sciences
- Advisors: Professors Michael J. Aziz and Frans A. Spaepen

B.S. in Materials Science and Engineering **Feb 2002**
Seoul National University, Department of Materials Science and Engineering

Journal Articles

Ahn, W.-Y., Haines, N., & Zhang, L. (2017) Revealing neuro-computational mechanisms of reinforcement learning and decision-making with the hBayesDM package. ***Computational Psychiatry***, 1:1.

Rogers, A. H., Seager, I., Haines, N., Hahn, H., Aldao, A., & **Ahn, W.-Y.** (2017) The indirect effect of emotion regulation on minority stress and problematic substance use in lesbian, gay, and bisexual individuals. ***Frontiers in Psychology***, 8, 1881.

Vilares, I., Wesley, M. J., **Ahn, W.-Y.**, Bonnie, R., Hoffman, M., Jones, O. D., Morse, S., Yaffe G., Lohrenz, T., & Montague, P. R. (2017) Predicting the knowledge-recklessness boundary in the human brain. ***Proceedings of the National Academy of Sciences (PNAS)***, 114(12), 3222-3227.

Ahn, W.-Y. & Busemeyer, J. R. (2016) Challenges and promises for translating computational tools into clinical practice. ***Current Opinion in Behavioral Sciences***, 11, 1-7.

Ahn, W.-Y.*, Ramesh*, D., Moeller, F. G., & Vassileva, J. (2016) Utility of machine learning approaches to identify behavioral markers for substance use disorders: Impulsivity dimensions as predictors of current cocaine dependence. ***Frontiers in Psychiatry***, 7. ***Co-first authors**

Ahn, W.-Y. & Vassileva, J. (2016) Machine learning identifies substance-specific behavioral markers for heroin and amphetamine dependence. ***Drug and Alcohol Dependence***, 161, 247-257.

Rass, O., **Ahn, W.-Y.**, & O'Donnell, B. F. (2016) Resting-state EEG, impulsiveness, and personality in smokers and non-smokers. ***Clinical Neurophysiology***, 127(1), 409-418.

Ahn, W.-Y., Kishida, K. T., Gu, X., Lohrenz, T., Harvey, A. H., Alford, J. R., Smith, K. B., Yaffe, G., Hibbing, J. R., Dayan, P., & Montague, P. R. (2014) Nonpolitical images evoke neural predictors of political ideology. ***Current Biology***, 24, 1-7.

Ahn, W.-Y., Vasilev, G., Lee, S., Busemeyer, J. R., Kruschke, J. K., Bechara A., & Vassileva, J. (2014) Decision-making in stimulant and opiate addicts in protracted abstinence: evidence from computational modeling with pure users. ***Frontiers in Decision Neuroscience***, 5:849.

Chan, T. W. S., **Ahn, W.-Y.**, Bates, J. E., Busemeyer, J. R., Guilaume, S., & Courtet, P. (2014) Differential impairments underlying decision making in anorexia nervosa and bulimia nervosa: A cognitive modeling analysis. ***International Journal of Eating Disorders***., 47(2), 157-167.

Konstantinidis, E., Speekenbrink, M., Stout, J. C., **Ahn, W.-Y.**, Shanks, D. R. (2014) To simulate or not? Comment on Steingroever, Wetzels, and Wagenmakers (2014). ***Decision***, 1(3), 184-191.

Vassileva, J., **Ahn, W.-Y.**, Weber, K., Busemeyer J. R., Gonzalez, R., Stout J. C., Cohen, M. (2013) Cognitive modeling analysis reveals distinct effects of HIV and drug use on decision-making processes in women. ***PLoS ONE***, 8(8), e68962.

Ahn, W.-Y., Rass, O., Fridberg, D. F., Bishara, A. J., Forsyth, J. K., Breier, A., Busemeyer, J. R., Hetrick, W. P., Bolbecker, A. R., & O'Donnell, B. F. (2011) Temporal discounting of rewards in patients with bipolar disorder and schizophrenia. ***Journal of Abnormal Psychology***, 120(4), 911-921.

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

Upton, D. J., Bishara, A. J., **Ahn, W.-Y.**, & Stout, J. C. (2010) Propensity for risk taking and trait impulsivity in the Iowa Gambling Task. Personality and Individual Differences. ***Personality and Individual Differences***, 50(4), 492-495.

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, 28-38.

Colleen, B., Krishnan, G., Vohs, J., **Ahn, W.-Y.**, Hetrick, W. P., Morzorati, S., & O'Donnell, B. F. (2009) Steady state responses: Electrophysiological assessment of sensory function in schizophrenia. ***Schizophrenia Bulletin***, 35(6), 1065-1077.

Ahn, W.-Y., Busemeyer, J. R., Wagenmakers, E.-J., & Stout, J. C. (2008) Comparison of decision learning models using the generalization criterion method. ***Cognitive Science***, 32(8), 1376-1402.

BOOK CHAPTERS

Ahn, W.-Y., Dai, J., Vassileva, J., Busemeyer, J. R., & Stout, J. C. (2016) Computational modeling for addiction medicine: From cognitive models to clinical applications. 224, 53-65. In Ekhtiari, H. & Paulus, M. (Eds.), ***Progress in Brain Research: Neuroscience for Addiction Medicine: From Prevention to Rehabilitation***. Elsevier.

Ahn, W.-Y., Jessup, R. K., & Busemeyer, J. R. (2013) Building bridges between neuroscience and complex decision making behavior. In L. Yuejia & Z.-L. Lu (Eds.), ***Progress in Cognitive Science: From Cellular Mechanisms to Computational Theories***. Peking University Press.

PEER-REVIEWED CONFERENCE PAPER

Ahn, W.-Y., Rass, O., Shin, Y.-W., Busemeyer, J. R., Brown, J. W., & O'Donnell, B. F. (2012) Emotion-based reinforcement learning. In N. Miyake, D. Peebles, & R. P. Cooper (Eds.) ***Proceedings of the*** 34^{th} ***Annual Conference of the Cognitive Science Society*** *(pp. 78-83). Austin, TX: Cognitive Science Society.*

MANUSCRIPTS UNDER REVIEW

Ahn, W.-Y., Hendricks, P. & Haines, N. (submitted) Easyml: A toolkit for easily building and evaluating machine learning models. bioRxiv. doi: 10.1101/137240.

Justice, L., **Ahn, W.-Y.**, & Logan, J. (under review) Identifying Children with Language Disorder: An Application of Machine Learning Classification.

Haines, N., Vassileva, J., & **Ahn, W.-Y.** (under review) The Outcome-Representation Learning model: a novel reinforcement learning model of the Iowa Gambling Task

Lee, S.-H., **Ahn, W.-Y.**, Seweryn, M., & Sadee, W. (under review) Combined genetic influence of the nicotinic receptor gene cluster CHRNA5/A3/B4 on nicotine dependence.

Hahn, H., Kalnitsky, S., Haines, N., Thamotharan, S., Beauchaine, T. P. & **Ahn, W.-Y.** (under review) Delay Discounting of Condom Use: Relationship Type and Sexual Orientation Influence Sexual Risk Behavior.

Honors and Awards

Association for Psychological Science (APS) 2017 Rising Star **Dec 2017**
- Presented to outstanding psychological scientists in the earliest stages of their research careers post-PhD (http://www.psychologicalscience.org/rising-stars/stars.cfm).

Jack and Linda Gill Outstanding Thesis Award - Honorable Mention **Sep 2011**
- Gill Center for Biomolecular Science, Indiana University
- Selected among graduate students in the Life Sciences from Indiana and Purdue Universities.

J. Stewart and Dagmar K. Riley Graduate Fellowship **2010-2011**
- College of Arts and Sciences Dissertation Year Research Fellowship, Indiana University
- Fellowship awarded to the most outstanding Ph.D. candidates at Indiana University

GPSO Travel Award **Spring 2010**
- Graduate and Professional Student Organization (GPSO), Indiana University

Commendation on Qualifying Examination, Indiana University **Fall 2009**

William K. Estes Summer Fellowship, Indiana University **Summer 2009**
- Fellowship given to a graduate student who does outstanding and rigorous research that encompasses formal or computational approaches to theory.

Travel fellowship to attend Summer Workshop on Decision Neuroscience **Aug 21-23, 2009**
- Hosted by INSEAD and Ross School of Business, University of Michigan

Indiana University College of Arts and Sciences Travel Award **Oct 2008**

Poster Award for Excellence at the 2nd Indiana Neuroimaging Symposium **Apr 2008**

Travel award for the IPAM Graduate Summer School, UCLA **July 9-26, 2007**
- Probabilistic Models of Cognition: The Mathematics of the Mind

Indiana University Graduate Fellowship **2006-2007**

Harvard University Graduate Fellowship **2002-2003**

Full-Scholarship from Duk-Myung academic foundation **Fall 2001**
- Scholarship for distinguished undergraduates at Seoul National University

Seoul National University Scholarship for Students with Academic Excellence **1997-1999**

Student Awards

Harliv Kaur (undergraduate)
NIDA Summer Research Internship ($3,840) **Spring 2017**

Julia Parker (undergraduate)
Summer Undergraduate Research Award ($3,500) **Spring 2017**

Qiaolan Deng (undergraduate)
Summer Undergraduate Research Award ($3,500) **Spring 2016**

Nathaniel Haines (graduate)
Accepted into the 2017 MIND Computational Summer School at Dartmouth **Aug 2017**

Nathaniel Haines (graduate)
Selected to attend a workshop on Bayesian estimation of Evidence Accumulation Models, Boston University, Cambridge, MA **Nov 2016**

Other Education

UCLA/Semel Neuroimaging Training Program, Los Angeles, CA **July 11-22, 2016**
Two-week long intensive summer school on advanced topics in neuroimaging

EEGLAB Workshop by Scott Makeig, Julie Onton, and Arnaud Delorme **Apr 20-22, 2009**
Indiana University, Bloomington, IN

IPAM Graduate Summer School, Los Angeles, CA **July 9-26, 2007**
Probabilistic Models of Cognition: The Mathematics of Mind
- Three-week long intensive summer school on Bayesian models of cognition

Teaching Experience

Seoul National University **Sep 2017 - Present**
- Instructor, Seminar in Psychopathology (graduate) **Fall 2017**
- Guest instructor, Abnormal Psychology (undergraduate) **Fall 2017**

The Ohio State University **Aug 2015 - Aug 2017**
- Instructor, Psychological Science of Addiction (undergraduate) **Spring 2017**
- Instructor, Cognitive and Affective Basis of Behavior (graduate) **Spring 2017**
- Instructor, Cognitive and Affective Basis of Behavior (graduate) **Spring 2016**
- Guest instructor, Intro to Bayesian Statistics for Psychological Data (graduate) **Spring 2017**
- Guest instructor, Quantitative & Statistical Methods (undergraduate) **Spring 2016**

Indiana University, Bloomington **Aug 2006 - May 2012**
- Lab instructor, Neuroimaging Methods and Statistics (undergraduate) **Spring 2010**
- Instructor, Methods of Experimental Psychology (undergraduate) **Spring 2009**
- Lab instructor, Advanced Statistics in Psychology I (graduate) **Fall 2008**
- Teaching Assistant, Statistical Techniques (undergraduate) **Spring 2008**
- Teaching Assistant, Health Psychology (undergraduate) **Spring 2008, Fall 2007**
- Teaching Assistant, Abnormal Psychology (undergraduate) **Fall 2007**

Academic Service

Editorial Board
- Journal of Neuroscience, Associate Editor **2018 - 2022**
- Frontiers in Psychopathology **October 2014 - Present**

- Frontiers in Emotion Science **March 2015 - Present**

Grant review (alphabetical order):
- The Medical Research Council (MRC), UK
- The Research Foundation - Flanders (FWO), Belgium
- Wellcome Trust, UK

Manuscript Review (alphabetical order):
- Assessment
- Archives of Clinical Neuropsychology
- Behavior Research Methods
- Cognition and Emotion
- Cognitive Science
- Drug and Alcohol Dependence
- Decision
- Emotion
- Frontiers in Emotion Science
- Frontiers in Human Neuroscience
- Frontiers in Decision Neuroscience
- Frontiers in Psychopathology
- Human Brain Mapping
- International Conference on Intelligent Biology and Medicine (ICIBM)
- Journal of Abnormal Psychology
- Journal of Behavioral Decision Making
- Journal of Experimental Psychology: General
- Journal of Mathematical Psychology
- Journal of Neuroscience (*Frequent Reviewer* in 2015, *Outstanding Reviewer* in 2017)
- Journal of Neuroscience, Psychology, and Economics
- Nature Human Behaviour
- Neuroimage
- Neuroimage: Clinical
- Neuropsychologia
- Nicotine & Tobacco Research
- Oxford Handbook of Computational and Mathematical Psychology
- PLOS ONE
- Proceedings of the Cognitive Science Society
- Psychological Assessment
- Psychological Science
- Psychological Medicine
- Psychonomic Bulletin & Review
- Schizophrenia Bulletin
- Schizophrenia Research

Trainees (The Ohio State University)
- Graduate student advisees: Nathaniel Haines (Aug 2016-Aug 2017), Hunter Hahn (Aug 2016-Aug 2017), Andrew Rogers (Jan 2017-Aug 2017)
- Lab managers: Nathaniel Haines (Aug 2015-July 2016), Iris (Yitong) Shen (Aug 2016-Aug 2017), Zoey Butka (July 2017-Aug 2017)

Dissertation/Thesis Committee (Seoul National University)

- Young-In Chung (Clinical) **Fall 2017**
- Boram Sun (Clinical) **Fall 2017**

Dissertation/Thesis Committee (The Ohio State University)

- Anjali Agarwal (Cognitive) **Fall 2015**
- Anne C. Wilson (Clinical) **Fall 2015**
- Benjamin Pfeifer (Clinical) **Spring 2016**
- Aimee Zisner (Clinical) **Fall 2016**
- Graham Cooper (Clinical) **Spring 2017**
- Ilana Seager (Clinical) **Spring 2017**
- Dana E. Kamara (Clinical) **Spring 2017**
- Patrick Whitmoyer (Clinical) **Spring 2017**
- Ran Zhou (Cognitive) **Spring 2017**
- Ziv Bell (Clinical) **Spring 2017**

Research Award Committee **Spring 2010**

- Graduate and Professional Student Organization (GPSO), Indiana University

Software Development

• Developed an R package called hBayesDM (**h**ierarchical **Bayes**ian modeling of **D**ecision-**M**aking tasks), which offers hierarchical Bayesian analysis of various computational models on an array of decision-making tasks with a single line of coding. Tutorials and codes are available at https://github.com/CCS-Lab/hBayesDM.

• Developed a package called easyml (easy machine learning), which is a toolkit for easily building and evaluating machine learning models, both in R and Python. Codes are available at https://github.com/CCS-Lab/easyml.

Current Professional Memberships

Association for Psychological Science
Society for Mathematical Psychology
Society for Neuroscience

References

Professor Jerome R. Busemeyer
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Professor Brian F. O'Donnell
Department of Psychological and Brain Sciences
Indiana University, Bloomington
Tel: (812) 856-4164
Email: bodonnel@indiana.edu

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Virginia Tech Carilion Research Institute & University College London
Tel: (540) 526-2006
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Professor Peter Dayan
Gatsby Computational Neuroscience Unit
University College London
Tel: +44 (0) 20-7679-1175
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