Seongmin A. Park

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Assistant Professor

Department of Psychology | School of Neuroscience | Department of Biomedical Engineering Virginia Tech

Principal Investigator, *Computational Cognitive Neuroscience Lab*

890 Drillfield Drive Blacksburg, VA 24060, USA

Education

Aug.2007 – Feb.2012	Ph.D. in Culture Technology (Cognitive Neuroscience), Graduate school of Culture Technology (GSCT), KAIST (Korea Advanced Institute of Science and Technology), Daejeon, South Korea

Working Experiences

2025 – Present	Principal Investigator, Computational Cognitive Neuroscience Lab Department of Psychology, Virginia Tech, Blacksburg, VA, USA
2023 – Present	Tenured researcher (CRCN), French National Centre for Scientific Research (CNRS), Bron, France
2019 – 2023	Assistant Project Scientist in Center for Mind and Brain and Center for Neuroscience, Learning and Decision-Making Lab, Dr. Erie D. Boorman, University of California, Davis, CA, USA
2017 – 2019	Postdoctoral research fellow in Center for Mind and Brain, Learning and Decision-Making Lab, Dr. Erie D. Boorman, University of California, Davis, CA, USA,
2012 – 2017	Postdoctoral research fellow in ISC-MJ, UMR 5229, Neuroeconomics Laboratory, Dr. Jean-Claude Dreher, CNRS, Bron, France,

Publications

Published Journal Refereed Articles

2023	Jordan Crivelli-Decker, Alex Clarke, **Seongmin A. Park**, Derek J. Huffman, Erie D. Boorman, Charan Ranganath, *Goal-oriented representations in the human hippocampus during planning and navigation* ***Nature Communications*** 14, 2946
2022	Phillip P. Witkowski, ***Seongmin A. Park***, Erie D. Boorman, *Neural mechanisms of credit assignment for inferred relationships in a structured world* ***Neuron*** 110, 1–11
2021	**Seongmin A. Park**, Douglas S. Miller, Erie D, Boorman, *Novel inferences in a multidimensional social network use a grid-like code,* ***Nature Neuroscience*** 24, 1292–1301
2021	**Seongmin A. Park**, Douglas S. Miller, Erie D. Boorman, *Protocol for building a cognitive map of structural knowledge in humans by integrating piecemeal learned abstract relationships from separate experiences,* ***STAR Protocols***, 2(2), 100423

2021 Erie D. Boorman, Phil P. Witkowski, Yanchang Zhang, **Seongmin A. Park**,
*The orbital frontal cortex, task structure, and inference***,**
Behavioral Neuroscience, 135 (2), 291

2021 Erie D. Boorman, Sarah C. Sweigart, **Seongmin A. Park,**
Cognitive maps and novel inferences: a flexibility hierarchy,
Current Opinion in Behavioral Sciences, 38, 141-149

2020 **Seongmin A. Park**, Douglas S. Miller, Hamed Nili, Charan Ranganath, Erie D. Boorman,
Map making: constructing, combining, and inferring on abstract cognitive maps,
Neuron, 107 (6), 1-13

2019 Koosha Khalvati, **Seongmin A. Park**, Saghar Mirbagheri, Remi Philippe, Mariateresa Sestito, Jean-Claude Dreher, Rajesh P.N. Rao,
Modeling Other Minds: Bayesian Inference Explains Human Choices in Group Decision Making,
Science Advances, 5 (11), eaax8783

2019 **Seongmin A. Park,** Mariateresa Sestito, Erie D. Boorman, Jean-Claude Dreher*,*
Neural computations underlying strategic social decision-making in groups,
Nature Communications, 10 (1), 1-12

2018 Romuald Girard, Ignacio Obeso, Stéphane Thobois, **Seongmin A. Park**, Tiphaine Vidal, Emilie Favre, Miguel Ulla, Emmanuel Broussolle, Paul Krack, Franck Durif, Jean-Claude Dreher,
Wait and you shall see: sexual delay discounting in hypersexual Parkinson's disease,
Brain 142 (1), 146–162

2017 **Seongmin.A. Park**, Sidney Goïame, David A. O'Connor, Jean-Claude Dreher,
Integration of individual and social information for decision-making in groups of different sizes,
PLoS Biology, 15.6 (2017): 15 (6), e2001958

2015 **Seongmin A. Park**, Kyongsik Yun, and Jaeseung Jeong,
Reappraising Abstract Paintings after Exposure to Background Information,
PLoS ONE, 10(5): e0124159

2013 **Seongmin A. Park**, Soyeong Jeong and Jaeseung Jeong,
TV programs that denounce unfair advantage impact women's sensitivity to defection in the Public goods game, ***Social Neuroscience***, 8(6), 568–582

2006 **Seongmin A. Park**, and SeungHo Ryu,
The influence of immersive experience of gamer on product placement (PPL) advertising perception,
Journal of Korea Game Society, 6 (3)

In review

2023 **Seongmin A Park**, Jacob L. Russin*, Maryam Zolfaghar*, Randall C O'Reilly, Erie D Boorman (*,contributed equally),
The Geometry of Map-Like Representations under Dynamic Cognitive Control
Biorxiv, https://www.biorxiv.org/content/10.1101/2023.02.04.527142

2021 Linda Q Yu *, **Seongmin A Park** *, Sarah C Sweigart, Erie D Boorman †, Matthew R Nassar † (*,† equal contributions),
Do grid codes afford generalization and flexible decision-making?
Arxiv, https://arxiv.org/pdf/2106.16219

Peer-Reviewed Conference Proceedings

2022 **Seongmin A. Park***, Jacob L. Russin*, Maryam Zolfaghar*, Randall C O'Reilly, Erie D Boorman, (*,contributed equally),

The Geometry of Map-Like Representations under Dynamic Cognitive Control, Proceedings of the annual meeting of the cognitive science society (***CogSci***)

2022 Jacob L. Russin, Maryam Zolfaghar, **Seongmin A. Park**, Randall C O'Reilly, Erie D Boorman, *A Neural Network Model of Continual Learning with Cognitive Control*, Proceedings of the annual meeting of the cognitive science society (***CogSci***)

2022 **Seongmin A. Park***, Jacob L. Russin*, Maryam Zolfaghar*, Randall C O'Reilly, Erie D Boorman (*,contributed equally), *The geometry of map-like representations under dynamic cognitive control*, Computational and Systems Neuroscience (***Cosyne***)

2021 Jacob L. Russin, Maryam Zolfaghar, **Seongmin A Park**, Erie D Boorman, Randall C O'Reilly, *Complementary Structure-Learning Neural Networks for Relational Reasoning*, Proceedings of the annual meeting of the cognitive science society (***CogSci***)

2020 Seongmin A. Park, Douglas S. Miller, Erie D Boorman, *Hexadirectional coding of decision trajectories through abstract and discrete spaces*, Computational and Systems Neuroscience (***Cosyne***)

2019 Koosha Khalvati, Saghar Mirbagheri, **Seongmin A. Park,** Jean-Claude Dreher, Rajesh PN Rao*,* *A Bayesian Theory of Conformity in Collective Decision Making*, Neural Information Processing Systems (***NeurIPS***)

2016 Koosha Khalvati, **Seongmin A. Park**, Jean-Claude Dreher, Rajesh Rao, *A Probabilistic Model of Social Decision Making based on Reward Maximization,* Neural Information Processing Systems (***NeurIPS***)

Research Grants

Feb. 2024 Jan.2028 French National Research Agency (ANR)
Neural mechanisms of learning and representing hidden task structures to afford generalization in problem solving,
€369,695 for 48 months (Role: Principal Investigator).

Jan. 2022 Dec.2025 French National Research Agency (ANR) and University of Lyon,
CORTEX Chair of Excellence, *Structure abstraction and flexible behavior,*
€300,000 for 24 months (Role: Principal Investigator).

Invited Talks

Jun. 2025 *Structural abstraction and behavioral flexibility,* Max Planck Institute for Biological Cybernetics

Jan. 2025 *Structural abstraction and behavioral flexibility,* Schuck Lab, University of Hamburg

Sep. 2024 *Structural abstraction and behavioral flexibility*,
Neuromodulation Institute, Paris, France

Sep. 2024 *Structural abstraction and behavioral flexibility*,
L'Institut de Neurosciences de la Timone (INT) Marseille, France

Sep. 2023 *Structural abstraction and behavioral flexibility,*
NeuroCompare: Comparative Neuronal Circuits for Adaptive Behaviour, Bordeaux, France

Sep. 2023 *Structural abstraction and behavioral flexibility*, Psychology department,
Korea university, Seoul, South Kora

Sep. 2023	*Structural abstraction and behavioral flexibility*, Department of Biomedial engineering, Ulsan National Institute of Science & Technology, Ulsan, South Kora
Sep. 2022	*The geometry of cognitive maps under dynamic cognitive control,* Nee lab, Florida State University
Jun. 2022	*Understanding human cognition using neuroimaging,* Methodology of Social Science Seminar Series, Seoul National University, Seoul, South Korea
May. 2022	*The geometry of cognitive maps under dynamic cognitive control*, 25th Korean Society for Brain and Neural Sciences (KSBNS), Incheon, South Korea
May. 2022	*The geometry of cognitive maps under dynamic cognitive control*, Neuroimaging center, Sungkyunkwan University, Suwon, South Korea
Nov. 2021	*How does the brain construct and navigate a cognitive map of abstract relationships to guide novel decision-making?,* Neuroscience and Social Decision Making talk Series, Princeton University
Mar. 2021	*How does the brain construct and navigate a cognitive map of abstract relationships to guide novel decision-making?*, Neuroimaging center, Sungkyunkwan University, Suwon, South Korea
Nov. 2020	*Neural computations of strategic decision-making in the volunteer's dilemma,* Social Computational Neuroscience Symposium, Peking University
Oct. 2020	*How does the brain construct and navigate a cognitive map of abstract relationships to guide novel decision-making?*, Feldmanhall Lab, Brown University
Sep. 2020	*How does the brain construct and navigate a cognitive map of abstract relationships to guide novel decision-making?* fMRI brown bag, Dartmouth College
Feb. 2018	*How does the brain infer unobserved relationships between elements in different knowledge structures?* Memory seminar, UC Davis, CA, USA
Oct. 2017	*Neural computations of strategic decision-making in the volunteer's dilemma*, perception cognition and cognitive neuroscience (PCCN) seminar, UC Davis, CA, USA
Feb. 2016	*Cooperative decision-making in volunteer's dilemma* Hanse-Wissenschaftskolleg, Institute for Advanced Study, Delmenhorst, Germany
Jan. 2016	*Neural mechanisms of collective decision-makings in a group* Centre de neurosciences cognitives, CNRS, Bron, France
Nov. 2014	*Subjective confidence in one's decision and group size effect during group decisions* Virginia Tech Carilion Research Institute, Roanoke, VA, USA
Sep. 2013	*How we make a decision as a group member* Neuroscience department, Università degli Studi di Parma, Parma, Italy
Oct. 2012	*Neural Underpinnings of Factors influencing Aesthetic Judgment of Artworks* Centre de neurosciences cognitives, CNRS, Bron, France

Conference Presentations

Jun. 2023	Seongmin A. Park, Maryam Zolfaghar, Jacob L. Russin, Douglas S. Miller, Randall C. O'Reilly, Erie D. Boorman, *Dynamics of Representational Geometry in Social Hierarchies and Cognitive Control,* Society for Neuroeconomics (SNE 2024), Cascais, Portugal
Jun. 2023	Seongmin A. Park, Maryam Zolfaghar, Jacob L. Russin, Douglas S. Miller, Randall C. O'Reilly, Erie D. Boorman, *The geometry of cognitive maps under dynamic cognitive control,* Symposium on Biology of Decision Making (SBDM 2023), Paris, France

Nov. 2022	Seongmin A. Park, Maryam Zolfaghar, Jacob L. Russin, Douglas S. Miller, Randall C. O'Reilly, Erie D. Boorman, *The geometry of cognitive maps under dynamic cognitive control,* Society for Neuroscience (SfN 2022), San Diego, CA, USA
Aug.2022	Seongmin A. Park, Maryam Zolfaghar, Jacob L. Russin, Douglas S. Miller, Randall C. O'Reilly, Erie D. Boorman, *The geometry of cognitive maps under dynamic cognitive control,* Cognitive Computational Neuroscience (CCN 2022), San Francisco, CA, USA
Apr. 2022	Seongmin A. Park, Maryam Zolfaghar, Jacob L. Russin, Douglas S. Miller, Randall C. O'Reilly, Erie D. Boorman, *The geometry of neural representations of cognitive maps under dynamic cognitive control for flexible decision-making,* Cognitive neuroscience society (CNS 2022), San Francisco, CA, USA
Oct. 2020	Seongmin A. Park, Douglas S. Miller, and Erie D. Boorman, *Grid-like codes for novel inferences during value-based decision making,* Society for Neuroeconomics (SNE 2020), Virtual
Oct. 2019	Seongmin A. Park, Douglas S. Miller, and Erie D. Boorman, *Hexadirectional coding in human entorhinal cortex represents the trajectory through social networks during decision-making*, Society for Neuroscience (SfN 2019), Chicago, IL, USA
Sep. 2019	Seongmin A. Park, Douglas S. Miller, and Erie D. Boorman, *Hexadirectional coding of trajectories through an abstract multidimensional social network during decisions*, Cognitive Computational Neuroscience (CCN 2019), Berlin, Germany
Sep. 2019	Seongmin A. Park, Douglas S. Miller, Hamed Nili and Erie D. Boorman, *A cognitive map of social network space*, Cognitive Computational Neuroscience (CCN 2019), Berlin, Germany
Aug. 2019	Seongmin A. Park, Douglas S. Miller, and Erie D. Boorman, *Hexadirectional coding of trajectories through an abstract and discrete social network during decisions-making,* Bay Area Memory Meeting (BAMM 2019), San Jose, CA, USA
May, 2019	Seongmin A. Park, Douglas S. Miller, Hamed Nili and Erie D. Boorman, *Integrating discrete abstract structures to construct cognitive maps of social hierarchies*, Social and affective neuroscience (SANS 2019), Miami, Fl, USA
Nov. 2018	Seongmin A. Park, Douglas S. Miller, Hamed Nili and Erie D. Boorman, *Integrating discrete abstract structures to construct cognitive maps of social hierarchies,* Society for Neuroscience (SfN 2018), San Diego, CA, USA
Sep. 2017	Seongmin A. Park, and Jean-Claude Dreher, *Neural computations of strategic decision-making in the volunteer's dilemma*, Society for Neuroeconomics (SNE 2017), Toronto, Canada
Jun. 2017	Seongmin A. Park, *Neural computations of strategic decision-making in the volunteer's dilemma*, Reinforcement Learning and Decision Making (RLDM 2017), Ann Arbor, MI, USA
Jun. 2016	Seongmin A. Park, Sidney Goïame, David A. O'Connor and Jean-Claude Dreher, *The dlPFC mediates decision confidence to influence social conformity*, Decision Neuroscience in Humans, Delmenhorst, Germany
Jun. 2016	Seongmin A. Park, Sidney Goïame, David A. O'Connor and Jean-Claude Dreher, *The brain optimally integrates group size and social influence during group decision-making*, Decision Neuroscience in Humans, Delmenhorst, Germany
May. 2015	Seongmin A. Park, Sidney Goïame, and Jean-Claude Dreher, *Neural mechanisms underlying diffusion of responsibility,* Symposium on biology of decision-making (SBDM 2015), Paris, France
May. 2015	Seongmin A. Park, Sidney Goïame, and Jean-Claude Dreher, *The brain optimally integrates group size and social influence during group decision-making,* Symposium on biology of decision-making (SBDM 2015), Paris, France

Nov. 2014	Seongmin A. Park, Sidney Goïame, and Jean-Claude Dreher, *Subjective confidence in one's decision and group size effect during group decisions*, Society for Neuroscience (SfN 2014), Washington DC, USA
Jun. 2014	Seongmin A. Park, and Jean-Claude Dreher, *Justice decisions: brain integration of confidence in own judgment and other's opinion*, The Annual Congress of the French Economic Association (63rd AFSE), Lyon, France
Jun. 2014	Seongmin A. Park, and Jean-Claude Dreher, *Justice decisions: brain integration of confidence in own judgment and other's opinion,* Organization for Human Brain Mapping (OHBM 2014), Hamburg, Germany
May 2014	Seongmin A. Park, Sidney Goïame, and Jean-Claude Dreher, *Third-party punishment for justice – how does the brain integrate one's confidence in judgment and other juror's opinion,* Symposium on biology of Decision Making (SBDM 2014), Paris, France
Jun. 2012	Seongmin A. Park and Jaeseung Jeong, *Artistic style recognition influences on reward processing during aesthetic judgment of paintings,* Organization for Human Brain Mapping (OHBM 2012), Beijing, China
Jun. 2012	Seongmin A. Park, Yongjin Jin, Chongwook Chung, and Jaeseung Jeong, *Neural correlates of alterations in aesthetic judgment of artworks with judgments of others*, Organization for Human Brain Mapping, (OHBM 2012), Beijing, China
Apr. 2012	Seongmin A. Park; Youngjin Jin, Chongwook Chung, and Jaeseung Jeong, *Neural correlates of social influences on aesthetic judgment for artworks*, Social & Affective Neuroscience Society Annual Meeting (SANS 2012), New York, USA
Nov. 2010	Seongmin A. Park, Yoonsol Lee, Chongwook Chung, and Jaeseung Jeong, *The effect of contextual framing on the aesthetic appraisal of visual artworks*, Society for Neuroscience (SfN 2010), San Diego, CA, USA
Oct. 2009	Seongmin A. Park, Soyeong Jeong, and Jaeseung Jeong, *The influence of investigative TV report on viewers' cooperative and free-riding behaviors in public goods game*, Society for Neuroscience (SfN 2009). Chicago, IL, USA
Apr. 2008	Seongmin A. Park, Kyongsik Yun, and Jaeseung Jeong, *Painting's information increases aesthetic preference for contemporary paintings* Cognitive Neuroscience Society (CNS), San Francisco, CA, USA

Scholarships

2005 - 2011	Selected as fully supported scholarship program by *Korea Ministry of Culture, Sports and Tourism*
2001 - 2005	Selected as fully supported scholarship program by *Korea Research Foundation*

Honors and Awards

Apr. 2022	CNS 2022 Trainee Abstract Travel Award
Sep. 2019	CCN 2019 Trainee Abstract Travel Award
Apr. 2019	Gazzaniga award, Best poster, Center for mind and Brain, UC Davis
Mar. 2019	CNS 2019 Trainee Abstract Travel Award
Jun. 2012	OHBM 2012 Trainee Abstract Travel Award

Aug. 2007	Minister's Award for Excellent Student (Unanimous Recommendation from faculty members in Graduate School of Culture Technology (GSCT))
Feb. 2007	*Summa Cum Laude*, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea
Aug. 2005	*Summa Cum Laude*, Ajou University, Suwon, Korea

Service

Ad Hoc Reviewer

Grant

- NSF, USA
- SSHRC, Canada
- Einstein Foundation Berlin, Germany

Journal

Cell; Nature Neuroscience; Nature Human Behaviour; Nature Communications; Science Advances; Neuron; PNAS; Current Biology; Plos Biology; Cell Reports; eLife, Journal of Neuroscience; Communication Biology; Cerebral Cortex; Social Cognitive and Affective Neuroscience; Cortex; Scientific Reports; STAR Protocols; Journal of Experimental Psychology: General; Frontiers in Psychiatry; and Cognitive Processing;

Conference

- Conference on Cognitive Computational Neuroscience (CCN)
- Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM)
- Neural Information Processing Systems (NeurIPS)
- Organization for Human Brain Mapping (OHBM)

Conference/Workshop organization

- Symposium on Biology of Decision-Making (SBDM 2025), Jun, 2025, Lyon, France
- *Do grid codes afford generalization and flexible decision-making?*, Conference on Cognitive Computational Neuroscience (CCN 2020), Generative Adversarial Collaborations Series, Oct. 2020