Won Lee

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EDUCATION & CAREER

Champagne Lab, The University of Texas at Austin, Austin, TX
Postdoctoral researcher, June 2020 – Present

Columbia University, New York, NY
Ph.D. in Psychology – Behavioral Neuroscience, May 2020
Primary advisor: Dr. James P. Curley, Co-advisor: Dr. Rae Silver, Dr. Frances Champagne
Visiting Scholar at the University of Texas at Austin, December 2017 – May 2020
M.Phil. in Psychology, October 2019
M.A. in Psychology, October 2017

Teachers College, Columbia University, New York, NY
M.S. in Neuroscience and Education, October 2015

Seoul National University, Seoul, South Korea
B.S. *summa cum laude* in Biology Education, Minor in Psychology, August 2013
Valedictorian of the College of Education

FELLOWSHIPS AND AWARDS

Psychology Department Travel Award, Columbia University, May 2019
Art and Science Graduate Council Student Travel Grant, Columbia University, May 2019
Neuroscience Fellowship, Columbia University, Fall 2015 – Spring 2016
Dean's Fellowship, Columbia University, **Fall 2015 – Spring 2020**
Samsung Scholarship for Ph.D. study, Samsung Scholarship Foundation, **Fall 2015 – Spring 2020**
Scholarship Granted by the College of Education, SNU, Fall 2011 – Spring 2012
Eminence Scholarship, SNU, Fall 2010 – Spring 2011
Superior Academic Performance Scholarship, SNU, Spring 2009, Spring 2010, Fall 2011
Korea Scholarship Foundation Scholarship, Korea Scholarship Foundation, Fall 2009

PUBLICATION

Lee W, Milewski TM, Curley JP. (*submitted to PNAS*). Distinct immunophenotypic and transcriptomic responses to social status in mouse social hierarchies.

Chase ID, Coehlo D, **Lee W**, Mueller K, Curley JP. (*in revision, Social Networks*). Networks never rest: An investigation of network evolution in three species of animals.

Lee W, Dowd H, Nikain C, Dwortz M, Yang E, Curley JP. (2021). Effect of relative social rank within a social hierarchy on neural activation in response to familiar or unfamiliar social signals. *Scientific Reports.*

Beery AK, Holmes MM, **Lee W**, Curley JP. (2020). Stress in groups: Lessons from non-traditional rodent species and housing models. *Neuroscience & Biobehavioral Reviews.*

Lee W, Fu J, Bouwman N, Farago P, Curley JP. (2019). The temporal microstructure of dyadic social behavior pre- and post- social relationship resolution. *PLOS ONE.*

Lee W, Hiura LC, Yang E, Broekman KA, Ophir AG, Curley JP. (2019). Social status in mouse social hierarchy is associated with oxytocin and vasopressin 1a receptor density. *Hormones and Behavior.*

Williamson CM, **Lee W**, Decasien AR, Lanham A, Romeo RD, Curley JP. (2019). Social hierarchy position in female mice is associated with plasma corticosterone levels and hypothalamic gene expression. *Scientific Reports*

Lee W, Yang E, Curley JP. (2018). The frequency and temporal pattern of eating and drinking are associated with social status and context in mouse social hierarchies. *PeerJ*

Williamson CM., Klein IS, **Lee W**, Curley JP. (2018). Immediate early gene activation throughout the brain is associated with dynamic changes in social context. *Social Neuroscience*

Lee W, Khan A, Curley JP. (2017). Major Urinary Protein Levels are Associated with Social Status and Context in Mouse Social Hierarchies. *Proceedings of Royal Society B.* 284: 20171570.

Williamson CM, **Lee W**, Romeo RD, Curley JP (2017). Social context-dependent relationships between mouse dominance rank and plasma hormone levels. *Physiology & Behavior.*

Williamson CM, **Lee W**, Curley JP (2016). Temporal dynamics of social hierarchy formation and maintenance in male mice. *Animal Behaviour,* 115, 259-272.

ONGOING COLLABORATION

Brain transcriptomic profiling on mice exposed to primate gut microbiome
Collaborator: Alex DeCasien (Department of Biological Anthropology, New York University), Dr. Katherine Ryan Amato (Department of Anthropology, Northwestern University)

Hepatic transcriptomic profiling on mice exposed to primate gut microbiome
Collaborator: Dr. Katherine Ryan Amato (Department of Anthropology, Northwestern University)

Transcriptomic profiles underpinning social dominance across vertebrates
Collaborator: Dr. Hans Hoffman, Dr. Becca Young (Department of Integrative Biology, University of Texas at Austin)

RESEARCH EXPERIENCE

Postdoctoral Researcher June 2020 – Present
Champagne & Curley Social Neurobiology Lab, University of Texas at Austin Austin, TX

- Tackle challenges in analyzing brain transcriptome data encompassing heterogeneity across multiple brain regions by implementing machine learning and network-based modeling approach, aiming to identify key driver genes of stress resilience and metabolism shift upon social environment change
- Collaborate to develop library prep and data analysis pipeline for hydroxymethylation (5hmC) sequencing
- Lead collaborative bioinformatics analysis projects with three labs (Northwestern, NYU, UT Austin) via facilitating sample preparation and raw data processing for high-throughput tag-based RNA sequencing

Graduate Research Fellow April 2014 – May 2020
Champagne & Curley Social Neurobiology Lab, Columbia University & University of Texas at Austin

- Published 10 research articles (5 first-authored, 3 from outside-of-institution collaborations)
- Learned hierarchical modeling and Bayesian statistics to properly model biological data associated with social behavior using R, Python, and bash scripting
- Adopted and refined multiple state-of-art lab techniques for time-sensitive experiments to investigate association between stress resilience and psychoneuroimmunology
- Developed new behavioral observation survey and paradigm to better capture social behavior of group-living mice and efficiently collect biological samples with low cost

- Pivotal contribution in establishing a new lab at UT Austin (construction plan and floor design, high-stake equipment purchase, personnel recruitment, communication liaison**)**
- Presented 4 times at prestigious conferences, invited to present in an international conference, initiated three new out-of-institution collaborations by actively networking at the conferences
- Trained 12 undergraduate students on animal handling, behavioral observation, wet lab protocols then assigned and supervised them based on each student's talent and interest

SKILLS

Bioinformatics analysis – R, Python, shell scripting (Bowtie2, Kallisto, Salmon, Samtools, MultiQC,Differential network analysis, WGCNA, ARACNe, DESeq2, edgeR, pandas, scikit-learn, dimensionality reduction, hub/key driver gene detection, RRHO, differentially expressed gene, gene ontology analysis (GO))
Statistical analysis (Bayesian hierarchical modeling, social network analysis, mixed effects model)
Flow cytometry
Immunohistochemistry
Western blot
qPCR
DNA/RNA extraction from various biological sample types
In situ hybridization (from making probes to staining)
Cryosectioning and microdissection of mouse brain
Intracerebral viral injection surgery
Intracranial cannulation surgery
Radiotelemetry transmitter implantation surgery (EEG and ECG)
Behavioral observation
Mouse handling (submandibular bleeding, urine collection, behavioral testing)
Mouse perfusion
IACUC Protocol writing

INVITED TALKS

Bayesian regression models with ordinal variables using R
UMass Boston Advanced Statistical Collaborative, November 10th, 2020

Introduction to Mixed Effects Model
Department of Psychology, UT Austin, January 15th, 2020

Effects of social experience on physiological and immune markers in mouse social hierarchies
Brain, Behavior, Ecology Seminar, Department of Biology, UT Austin, April 26, 2019

Physiological and neurobiological adaptations in mouse social hierarchies
Behavioral Neuroscience Seminar, Department of Psychology, UT Austin, March 21st, 2018

CONFERENCE PRESENTATION

Lee W, Milewski TM, Curley JP. (2020). Distinct immunophenotypic and transcriptomic responses to social status in mouse social hierarchies. Society for Social Neuroscience (S4SN) 11thAnnual Meeting. Chicago, IL (Virtual).

Milewski TM, **Lee W**, Curley JP. (2020). Social ascension and descension in mouse social hierarchies lead to rapid changes in plasma corticosterone and neural gene expression. Society for Social Neuroscience (S4SN) 11thAnnual Meeting. Chicago, IL (Virtual).

Lee W, Curley JP. (2019). Effects of social experience on immune parameters and brain transcriptome in mouse social hierarchies. Society for Social Neuroscience (S4SN) 10thAnnual Meeting & Society for Neuroscience 49th Annual Meeting. Chicago, IL.

Lee W, Curley JP. (2019). Effects of social experience on immune parameters and brain transcriptome in mouse social hierarchies. International School of Ethology, 44th meeting on: Social stress: Psychosocial and psychosomatic implications. Erice, Sicily, Italy.

Lee W, Dowd H, Nikain C, Norman E, Yang E, Curley JP. (2017). Effect of relative social rank within a social hierarchy on neural activation in response to familiar or unfamiliar social signals. Society for Social Neuroscience (S4SN) 8thAnnual Meeting & Society for Neuroscience 47th Annual Meeting. Washington, DC.

Williamson CM, **Lee W**, Klein I, Curley JP. (2017). Immediate early gene activation throughout the social behavior network in response to dynamic changes in social status. Society for Social Neuroscience (S4SN) 8th Annual Meeting & Society for Neuroscience 47th Annual Meeting. Washington, DC.

Curley JP, **Lee W**, Williamson CM, Klein I, Dowd H. (2016) Immediate Early Gene Activation in the Social Decision-Making Network is Associated with Dynamic Social Behavior in Social Hierarchies. Society for Social Neuroscience (S4SN) 7th Annual Meeting. San Diego, California.

Lee W, Dowd H, Norman E, Curley JP. (2016) Effect of relative social rank within a social hierarchy on major urinary protein production and neural activation. Annual meeting of Society of Behavioral Neuroendocrinology (SBN). Montreal, Canada.

Williamson CM, Klein I, **Lee W**, Curley JP. (2016) Whole brain mapping of immediate early gene activation in response to dynamic changes in social context and status. Annual meeting of Society of Behavioral Neuroendocrinology (SBN). Montreal, Canada

Williamson CM, Romeo R, **Lee W,** Curley JP. (2015). The role of hypothalamic gonadotropin-releasing hormone (GnRH) in regulating dynamic changes in mouse social status within a social hierarchy. Annual meeting of Society of Behavioral Neuroendocrinology (SBN). Pacific Grove, CA.

TEACHING EXPERIENCE

Columbia University, New York, New York
Teaching Assistant, Spring 2016 (Behavioral Neuroscience), Spring 2017 (Animal Behavior), Fall 2017 (Mind, Brain, and Behavior; Introduction to Developmental Psychology)
ELLIS Preparatory School, Bronx, New York
Science Teaching volunteer, Spring 2015 – Fall 2016
Maetan High School, Suwon, South Korea
High School Biology Teacher, 2013 – 2014
Teach for Equality Seoul, Seoul, South Korea
Pro bono science and math tutor, 2009 – 2011

MEMBERSHIP

Society for Neuroscience
Society for Social Neuroscience
Society for Behavioral Neuroendocrinology
The New York Academy of Sciences