

Annie J. Lee, Ph.D., M.S.

Columbia University Irving Medical Center
Department of Neurology
622 West 168th Street, PH 19-315, New York, NY 10032, USA
Phone: (212) 305-1604
Email: ajl2199@cumc.columbia.edu

Academic Appointments

05/2022-Present Assistant Professor of Neurological Sciences
Department of Neurology, Gertrude H. Sergievsky Center,
Taub Institute for Research on Alzheimer's Disease and the Aging Brain,
Columbia University Irving Medical Center, New York, NY

12/2019-04/2022 Instructor
Department of Neurology, Columbia University Irving Medical Center, New York, NY

Education

09/2013-05/2019 Ph.D in Biostatistics
Columbia University, New York, NY
Thesis title: Statistical Methods for Genetic Studies with Family History of Diseases^{16,17,20}
Advisor: Dr. Yuanjia Wang

09/2011-05/2013 M.S in Biostatistics
Columbia University, New York, NY

03/2005-02/2010 B.S in Mathematics, Double major in Statistics
Ewha Womans University, Seoul, South Korea

Training

06/2019-11/2019 Staff Scientist
Department of Neurology, Columbia University Irving Medical Center, New York, NY

09/2013-05/2019 Research Assistant
Department of Biostatistics, Columbia University, New York, NY

09/2012-07/2013 Statistical Genetics Analyst
Gertrude H. Sergievsky Center, Columbia University Medical Center, New York, NY

06/2012-08/2012 Summer Research Intern (NIH-IRTA)
NICHD, NIH, Rockville, MD

03/2010-06/2011 Research Assistant
Department of Computational Science and Engineering, Yonsei University, Seoul, South Korea

06/2007-08/2007 Summer Research Intern (NSF-AGEP)
Department of Statistics, Iowa State University, Ames, Iowa

Honors and Awards

10/2023 Junior Faculty Award, International Conference on Alzheimer's & Parkinson's Diseases and related neurological disorders (AD/PD)

12/2022 ASPIRE! Peer and Near-Peer Mentoring Program Awards

06/2022 Career MODE (Careers through Mentoring and training in Omics and Data) Program Awards,
NIH/NIGMS R25 Innovative Program to Enhance Research Training

04/2022 Skills for Health and Research Professionals (SHARP) Training Scholarship Awards

11/2021 KASBP (Korean American Society in Biotech and Pharmaceuticals) Fellowship Award

10/2021	Reserve and Resilience Travel Scholarship. NIA-supported Collaboratory on Research Definitions: 3 rd Workshop on Research Definitions for Reserve and Resilience in Cognitive Aging and Dementia
07/2019-06/2021	NIH TL1/T32 Postdoctoral Fellowship, Clinical and Translational Science Awards, <i>declined</i>
07/2018	ASA Korean International Statistical Society. Outstanding Student Paper Award
07/2016-06/2019	NIH/NIA F31 Individual Predoctoral Fellowship
07/2016	ASA Risk Analysis Section, Honorable Mention for Student Paper Award
07/2014-06/2016	NIH TL1/T32 Personalized Medicine Training Fellowship, Clinical and Translational Science Awards
05/2013	KSEA (Korean-American Scientists and Engineers Association)-KUSCO Scholarship Award
05/2013	KSEA Outstanding Poster Award
06/2012	NIH/NICHD Summer student Intramural Research and Training Award (IRTA),
03/2010-06/2011	World Class University Scholarship Award, Yonsei University
12/2009	Student Tutor Scholarship, Institute for teaching and learning, Ewha Womans University
09/2008-12/2009	Dean's list (Summa cum laude), Ewha Womans University
06/2007	NSF REU Alliance Graduate Education Professoriate Fellowship (AGEP), Iowa State University
09/2005	Ewha Frontier Scholarship for Global Health Research Project, Ewha Womans University

Administrative Leadership and Academic Service

ACADEMIC SERVICE

02/2022-Present	Committee Member, CUIMC Biostatistics Collaborative Model Working Group
09/2016-05/2019	Ph.D Representative, Biostatistics Student Cohort, Dept. of Biostatistics, Columbia University
09/2016-05/2019	Member, Graduate Student Research Seminars (GSRs), Columbia University
09/2012-05/2019	Member, Korean Graduate Student Association (KGSA), Columbia University
09/2011-05/2019	Member, Korean Graduate Students for Health (KGSH), Columbia University

Professional Organizations and Societies

MEMBERSHIPS

-	Alzheimer's Association International Conference (AAIC)
-	Alzheimer's & Parkinson's Diseases and related neurological disorders (AD/PD)
-	American Statistical Association (ASA)
-	Korean-American Scientists and Engineers Association (KSEA)

Educational Contributions

TEACHING

Fall 2023	Instructor, “Advanced Statistical and Computational Methods in Genetics and Genomics“ (P8119), Department of Biostatistics, Columbia University (3 hours per week for 15 weeks, 20 graduate students approximately)
Summer 2017, 2018	Instructor, “Statistical Computing with SAS“ (P6110), Columbia University The Biostatistics Epidemiology Summer Training Diversity Program (BEST) Diversity Program, REU program Funded by NIH/NHLBI (R25 HL096260-06)
Fall 2015	Teaching Assistant, “Probability“ (P8104), Department of Biostatistics, Columbia University <i>Instructor:</i> Dr. Prakash Goroochurn
Spring 2015	Teaching Assistant, “Statistical Inference“ (P8109), Dept. of Biostatistics, Columbia University <i>Instructor:</i> Dr. Arindam RoyChoudhury
Fall 2009	Teaching Assistant, “Complex Analysis II“, Dept. of Mathematics, Ewha Womans University

Instructor: Dr. Eung Il Ko.

Fall 2007 Teaching Assistant, “Modern Geometry“, Dept. of Mathematics, University of Northern Iowa
Instructor: Dr. Jerry R. Ridenhour

Spring, Fall 2007 Tutor, Department of Mathematics, University of Northern Iowa, Cedar Falls, Iowa

ADVISING AND MENTORSHIP

Fall 2023-Present Advising, Boyi Hu, Postdoctoral Research Scientist, Columbia University
Fall 2023-Present Advising, Xuesen Zhao, 2nd year Master student in Biostatistics, Columbia University
Summer 2023-Present Advising, Zuoquai Cui, 2nd year Master student in Biostatistics, Columbia University
Summer 2023-Present Advising, Zhengwei Song, 2nd year Master student in Biostatistics, Columbia University
Summer 2023 Advising, Tvisha Ragendri Devavarapu, 1st year Master student in Biostatistics, Columbia
Summer 2023 Mentoring, Danielle Savellano, Sophomore in Biology, Allegheny College
Summer 2023 Mentoring, Kayla Scott-McDowell, Junior in Biochemistry & Sociology, Mt. Holyoke College
Mentoring two undergraduate students from Biostatistics Epidemiology Summer Training
(BEST) Diversity Program, Columbia University
Summer 2023 Mentoring, Leah Kang, High school student, Northern Valley Regional High School
2015, 2016 Statistical Consultation for clinical research fellows

Publications

1. De Jager RM, **Lee AJ**, Sigalov A, Taga M. An image segmentation pipeline optimized for human microglia uncovers sources of morphological diversity in Alzheimer’s disease. bioRxiv 2024.02.01.577128; doi: <https://doi.org/10.1101/2024.02.01.577128>
2. Bartosch AMW, Youth EHH, Hansen S, Wu Y, Buchanan HM, Kaufman ME, Xiao H, Koo SY, Ashok A, Sivakumar S, Soni RK, Dumitrescu LC, Lam TG, Ropri AS, **Lee AJ**, Klein HU, Vardarajan BN, Bennett DA, Young-Pearse TL, De Jager PL, Hohman TJ, Sproul AA, Teich AF. ZCCHC17 modulates neuronal RNA splicing and supports cognitive resilience in Alzheimer's disease. *Journal of Neuroscience*. 2023; JN-RM-2324-22. doi: 10.1523/JNEUROSCI.2324-22.2023. PMID: 38050142.
3. Kalia V, Reyes-Dumeyer D, Dubey S, Nandakumar R, **Lee AJ**, Lantigua R, Medrano M, Rivera D, Honig LS, Mayeux R, Miller GW, Vardarajan BN. Lysophosphatidylcholines are associated with P-tau181 levels in early stages of Alzheimer's Disease. medRxiv. 2023 Aug 25:2023.08.24.23294581. doi: 10.1101/2023.08.24.23294581. PMID: 37662203; PMCID: PMC10473810.
4. Siddiqui T, Cosacak MI, Popova S, Bhattarai P, Yilmaz E, **Lee AJ**, Min Y, Wang X, Allen M, İş Ö, Atasavum ZT, Rodriguez-Muela N, Vardarajan BN, Flaherty D, Teich AF, Santa-Maria I, Freudenberg U, Werner C, Tosto G, Mayeux R, Ertekin-Taner N, Kizil C. Nerve growth factor receptor (Ngfr) induces neurogenic plasticity by suppressing reactive astroglial Lcn2/Slc22a17 signaling in Alzheimer’s disease. *npj Regenerative Medicine*. 2023 Jul 10;8(1):33. PMCID: PMC10333226. doi: [10.1038/s41536-023-00311-5](https://doi.org/10.1038/s41536-023-00311-5).
5. **Lee, A.J.**, Sanchez D., Reyes-Dumeyer D., Manly, J.J., Brickman, A.R., Vardarajan, B.N., Mayeux, R. Reliability and Validity of Self-reported Vascular Risk Factors in a Multi-Ethnic Community Based Study of Aging and Dementia. *Journal of Alzheimer’s Disease*. 2023; 95(1):275-285. PMCID: PMC10578288. doi: [10.3233/JAD-230374](https://doi.org/10.3233/JAD-230374)
6. Qiao M, **Lee AJ**, Dolly Reyes-Dumeyer, Kelley Faber, Alison Goate, Alan Renton, Michael Chao, Brad Boeve, Carlos Cruchaga, Margaret Pericak-Vance, Jonathan L. Haines, Roger Rosenberg, Debby Tsuang, Robert A. Sweet, David A. Bennett, Robert S. Wilson, Tatiana Foroud, Richard Mayeux, Badri N. Vardarajan. Polygenic Risk Score Penetrance & Recurrence Risk in Familial Alzheimer Disease. *Annals of Clinical and Translational Neurology*. 2023 May;10(5):744-756. PMCID: PMC10187719.
7. Honig LS, Kang MS, **Lee AJ**, Reyes-Dumeyer D, Piriz A, Soriano B, Franco Y, Coronado ZD, Recio P, Mejía DR,

- Medrano M, Lantigua RA, Teich AF, Dage JL, Mayeux R. Evaluation of Plasma Biomarkers for A/T/N Classification of Alzheimer Disease Among Adults of Caribbean Hispanic Ethnicity. *JAMA Network Open*. 2023 Apr;6(4):e238214. PMID: PMC10119732. doi: [10.1001/jamanetworkopen.2023.8214](https://doi.org/10.1001/jamanetworkopen.2023.8214)
8. Lee AJ, Ma Y, Yu L, Dawe RJ, McCabe C, Arfanakis K, Mayeux R, Bennett DA, Klein HU, De Jager PL. Multi-region brain transcriptomes uncover two subtypes of aging individuals with differences in Alzheimer risk and the impact of APOEε4. 2023. *bioRxiv* 2023.01.25.524961; doi: doi.org/10.1101/2023.01.25.524961 (under reviewed by *Cell Reports Medicine*)
 9. Yang Z, Wang C, Liu L, Khan A, Lee A, Vardarajan B, Mayeux R, Kiryluk K, Ionita-Laza I. CARMA is a new Bayesian model for fine-mapping in genome-wide association meta-analyses. *Nature Genetics*. 2023 Jun;55(6):1057-1065. PMID: 37169873.
 10. Cook L, Schulze J, Uhlmann WR, Verbrugge J, Marder K, Lee AJ, Wang Y, Alcalay RN, Nance M, Beck JC. Tools for communicating risk for Parkinson's disease. *npj Parkinson's Disease*. 2022 Nov;8(1):164. PMID: PMC9709050.
 11. Lee, A.J., Raghavan N.S., Bhattarai P., Siddiqui T., Sariya S., Reyes-Dumeyer S., Flowers X.E., Cardoso, S.A.L., De Jager, P.L., Bennett, D.A., Schneider, J.A, Menon, V., Wang, Y., Lantigua, R.A., Medrano, M. Rivera, D., Jiménez-Velázquez, I.A., Kukull, W.A., Brickman, A.M., Manly, J.J., Tosto, G., Kizil, C., Vardarajan, B.N., Mayeux, R. *FMNL2* regulates gliovascular interactions and is associated with vascular risk factors and cerebrovascular pathology in Alzheimer's disease. *Acta Neuropathologica*. 2022 Jul;144: 59-79. PMID: PMC9217776
 12. Tuddenham JF, Taga M, Haage V, Roostaei T, White C, Lee AJ, Fujita M, Khairallah A, Green G, Hyman B, Frosch M, Hopp S, Beach TG, Corboy J, Habib N, Klein HU, Soni RK, Teich AF, Hickman RA, Alcalay RN, Shneider N, Schneider J, Sims PA, Bennet DA, Olah M, Menon V, De Jager PL. A cross-disease human microglial framework identifies disease-enriched subsets and tool compounds for microglial polarization. 2022. *bioRxiv* 2022.06.04.494709; doi: doi.org/10.1101/2022.06.04.494709 (under reviewed by *Nature Neuroscience*)
 13. Trumpff C, Owusu-Ansah E, Klein HU, Lee AJ, Petyuk V, Wingo TS, Wingo AP, Thambisetty M, Ferrucci L, Seyfried NT, Bennett DA, De Jager PL, Picard M. Mitochondrial respiratory chain protein co-regulation in the human brain. *Heliyon*. 2022 Apr; 8(5):e09353. PMID: PMC9118667.
 14. Diaconu C, Lee AJ, Onomichi K, De Jager RL, Riley C, Levine L, Vargas W, Shelter K, De Jager PL, Farber RS. Hypogonadism in men with multiple sclerosis: Prevalence and clinical associations. *Multiple Sclerosis and Related Disorders*. 2022 Mar;59:103508. PMID: 35123293.
 15. Epstein S, Xia Z, Lee AJ, Dahl M, Edwards K, Levit E, Longbrake EE, Perrone C, Kavak K, Weinstock-Guttman B, Diallo F, Ricci A, Riley CS, De Jager PL, Farber R, Wesley SF; Multiple Sclerosis Resilience to COVID-19 (MSReCOV) Collaborative. Vaccination Against SARS-CoV-2 in Neuroinflammatory Disease: Early Safety/Tolerability Data. *Multiple Sclerosis and Related Disorders*. 2022 Jan;57:103433. PMID: PMC8638239.
 16. Klein HU, Trumpff C, Yang HS, Lee AJ, Picard M, Bennett DA, De Jager PL. Characterization of mitochondrial DNA quantity and quality in the human aged and Alzheimer's disease brain. *Molecular Neurodegeneration*. 2021 Nov; 16(1):75. PMID: PMC8572491.
 17. Raghavan NS, Dumitrescu L, Mormino E, Mahoney E, Lee AJ, Gao Y, Bilgel M, Goldstein D, Harrison T, Engelman CD, Saykin AJ, Whelan CD, Liu JZ, Jagust W, Albert M, Johnson SC, Yang H, Johnson K, Aisen P, Resnick SM, Sperling R, De Jager PL, The Alzheimer's Disease Neuroimaging Initiative, Schneider J, Bennett DA, Schrag M, Vardarajan B, Hohman TJ, Mayeux R. Association Between Common Variants in RBFox1, an RNA-Binding Protein, and Brain Amyloidosis in Early and Preclinical Alzheimer Disease. *JAMA Neurology*. 2020 Oct;77(10):1288–1298. PMID: PMC7309575
 18. Lee AJ, Wang Y, Alcalay RN, Mejia-Santana H, Saunders-Pullman R, Bressman S, Corvol JC, Brice A, Lesage S, Mangone G, Tolosa E, Pont-Sunyer C, Vilas D, Schüle B, Kausar F, Foroud T, Berg D, Brockmann K, Goldwurm S, Siri C, Asselta R, Ruiz-Martinez J, Mondragón E, Marras C, Ghate T, Giladi N, Mirelman A, Marder K, Michael J. Fox LRRK2 Cohort Consortium. Penetrance estimate of *LRRK2* p.G2019S Mutation in Non-Ashkenazi Jewish in the Michael J. Fox LRRK2 Consortium. *Movement Disorders*. 2017 Oct;32(10):1432-1438. PMID: PMC5656509

19. **Lee AJ**, Marder K, Alcalay RN, Wang Y. Estimation of Genetic Risk Function with Covariates in the Presence of Missing Genotypes. *Statistics in Medicine*. 2017 Sep;36(22):3533-3546. PMID: PMC5583003
20. Lee J.H, **Lee A.J**, Dang L-H, Pang D, Kisselev S, Krinsky-McHale S.J, Zigman W, Luchsinger J.A, Silverman W, Tycko B, Clark L.N, Schupf N. Candidate Gene Analysis for Alzheimer's Disease in Adults with Down syndrome. *Neurobiology of Aging*. 2017 Aug;56: 150-158. PMID: PMC5603247
21. Schupf N, **Lee AJ**, Park N, Dang LH, Pang D, Yale A, Oh DK, Krinsky-McHale SJ, Jenkins EC, Luchsinger JA, Zigman WB, Silverman W, Tycko B, Kisselev S, Clark L, Lee JH. Candidate genes for Alzheimer's disease are associated with individual differences in plasma levels of beta amyloid peptides in adults with Down syndrome. *Neurobiology of Aging*. 2015 Oct;36(10): e1-10. PMID: PMC4562880
22. Marder K, Wang Y, Alcalay RN, Mejia-Santana H, Tang MX, **Lee AJ**, Raymond D, Mirelman A, Saunders-Pullman R, Clark L, Ozelius L, Orr-Urtreger A, Giladi N, Bressman S; *LRRK2* Ashkenazi Jewish Consortium. Age Specific Penetrance of the *LRRK2* G2019S Mutation in the Michael J. Fox Ashkenazi Jewish *LRRK2* Consortium. *Neurology*. 2015 Jul;85(1): 89-95. PMID: PMC4501942
23. Fan R, **Lee AJ**, Lu Z, Liu A, Troendle JF, Mills JL. Association analysis of complex diseases using triads, parent-child dyads and singleton monads. *BMC Genetics*. 2013 Sep;14:78. PMID: PMC3844511

BOOK CHAPTERS, REVIEWS AND COMMENTARIES

1. **Lee AJ** (2012). Acknowledgement for proofreading of "Classic Problems of Probability." by Prakash Gorroochurn, Wiley, 2016 May. ISBN: 978-1-118-06325-5.

Invited and Contributed Talks

1. "Genome-wide Gene-based study in Multi-ethnic Cohorts identifies Genes that Interact with Vascular Risk Factors in Alzheimer's Disease." AD/PD, Lisbon, Portugal (03/2024)
2. "Vascular Risk Factors Harmonization." ADSP-PHC 2023 Investigators' Meeting, Nashville, TN, Hybrid (06/2023)
3. "Genetic Association Between Alzheimer's Disease and Cardio-Cerebrovascular Risk Factors." AD/PD, Gothenburg, Sweden, Hybrid (03/2023)
4. "Multi-region brain transcriptomes uncover two subtypes of aging individuals with differences in Alzheimer risk and the impact of APOEε4." NIA Annual Tri-Consortia Meeting-AMP AD-MODEL AD-TREAT AD (12/2021)
5. "Unsupervised Clustering of Aging Individuals Using Multi-Region Brain Transcriptomes." Joint Statistical Meetings (JSM) 2021, Virtual Conference, *contributed*. (08/2021)
6. "Population Structure of the Older Brain Using Multi-Region Transcriptomic Data Approach." AMP-AD MODEL-AD TREAT-AD Joint Annual Meeting (12/2020)
7. "Control Confounding by Familial Relatedness in Genome-Wide Association Studies." Joint Statistical Meetings (JSM) 2019, Denver, CO, *contributed*. (07/2019).
8. "Efficient Statistical Methods for Genome-Wide Association Studies with Disease Family History Data." Joint Statistical Meetings (JSM) 2018, Vancouver, *contributed*. (07/2018)
9. "Efficient Statistical Methods for Association Studies with Dense Genotypes and Family History of Disease." JSM 2017, Baltimore, MD, *contributed*. (08/2017).
10. "Estimation of Genetic Risk Function with Covariates in the Presence of Missing Genotypes." JSM 2016, Chicago, IL, *contributed*. (08/2016)
11. "Age Specific Risk of Parkinson's Disease with *LRRK2* G2019S mutations and Covariates." Translational Science 2016, The Association for Clinical and Translational Science (ACTS), Washington DC, *contributed*. (04/2016)

12. “Association analysis of complex diseases using triads, parent-child dyads and singleton monads.” 141st American Public Health Association Annual meeting and Exposition, Boston, MA, *contributed*. (11/2013). <https://apha.confex.com/apha/141am/webprogram/Paper295727.html>
13. “Multiple genes on Chromosome 21 are associated with individual differences in plasma levels of beta amyloid peptides in adults with Down syndrome.” US-Korea Conference on Science (UKC), NJ, *contributed*. (08/2013)
14. “Mathematical Modeling of the Immune Response in Tissues.” NSF-AGEP National meeting, Iowa city, IA, *contributed*. (07/2007)

Conference Activity

POSTERS

1. “Multi-ancestry Genome-wide Gene-Vascular Risk Factors Interaction Analyses in Alzheimer’s Disease.” Alzheimer’s Disease Sequencing Project (ADSP), Rockville, MD (03/2024)
2. “Multi-ethnic genome-wide, gene-based study identifies genes that interact with vascular risk factors in Alzheimer’s Disease.” Alzheimer’s Association International Conference (AAIC) 2023, Amsterdam, Netherlands (08/2023)
3. “Association of short tandem repeats with neuropathological features in late-onset of Alzheimer’s disease brains.” Alzheimer’s Association International Conference (AAIC) 2022, San Diego, CA (07/2022)
4. “Multi-region brain transcriptomes uncover two subtypes of aging individuals with differences in Alzheimer risk and the impact of APOEε4.” Alzheimer’s Association International Conference (AAIC) 2021, Denver, CO (07/2021)
5. “Age Specific Penetrance of the *LRRK2* G2019S Mutation in the Michael J. Fox Ashkenazi Jewish *LRRK2* Consortium.” 8th Annual Research Poster Day, TRANSFORM programs, Irving Institute for Clinical and Translational Research, Columbia University, NY. (04/2015)
6. “Association analysis of complex diseases using triads, parent-child dyads and singleton monads.” Practicum Poster Symposium, Department of Biostatistics, Columbia University, NY. (05/2013)
7. “Association Analysis of Complex Diseases Using Triads, Parent-child Pairs, and Singleton Cases.” NIH Summer Research Program Poster Day, Bethesda, MD. (08/2012)

Campus Talks

1. “Cerebrovascular Pathology in Alzheimer’s Disease: Mechanisms and Models.” Neurology Grand Rounds, Department of Neurology, Columbia University, NY. (03/2023)
2. “Short Tandem Repeats in Alzheimer’s Disease?.” Neuroimmunology seminar, Department of Neurology, Columbia University, NY. (07/2022)
3. “Gene interacts with cerebrovascular risk factors to alter Alzheimer’s disease risk.” Neuroimmunology seminar, Department of Neurology, Columbia University, NY. (09/2021)
4. “Exploring subtypes of aging human brains using transcriptomic profiles.” Neuroimmunology seminar, Department of Neurology, Columbia University, NY. (11/2020)
5. “Population structure of the aging human brain.” Precision Medicine Working Group, Department of Biostatistics, Columbia University, NY. (10/2020)
6. “Statistical Methods for Association Studies with Dense Genotypes and Family History of Disease.” Graduate Student Research Seminars (GSRS), Department of Biostatistics, Columbia University, NY. (05/2017)
7. “Estimation of Genetic Risk Function with Covariates in the Presence of Missing Genotypes.” Graduate Student Research Seminars (GSRS), Department of Biostatistics, Columbia University, NY. (03/2016)
8. “Estimation of Genetic Risk Function with Covariates in the Presence of Missing Genotypes.” Graduate Student Research Seminars (GSRS), Department of Biostatistics, Columbia University, NY. (10/2015)

9. "Exploring the validity of spatial model in the spread of Foot-and-mouth Disease." Yonsei University, Seoul, South Korea. (03/2011)
10. "Traffic flow with Non-linear first-order equation." Yonsei University, Seoul, South Korea. (05/2010)
11. "Reaction Diffusion Equation with Convection equation." Yonsei University, Seoul, South Korea. (03/2010)