Matthew A. Lalli

Instructor, Psychiatry
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RESEARCH INTERESTS

My research lies at the nexus of genomic technology development, induced pluripotent stem cell (iPSC)-based disease modeling, and systems biology to create and apply novel, scalable techniques to understand how genetic variation contributes to disease. Recent genetic studies have linked over 300 genes harboring rare mutations to the risk of neurodevelopmental disorders. Leveraging novel technologies, I aim to use these large-effect mutations to identify convergent molecular, cellular, and functional disease mechanisms and therapeutic targets.

EDUCATION

2010-2015	**Doctor of Philosophy** Biomolecular Science and Engineering University of California, Santa Barbara, CA
2004-2008	**Bachelor of Science** Biomedical Engineering Johns Hopkins University, Baltimore, MD

WORK EXPERIENCE

9/2020 – present	**Instructor** Icahn School of Medicine at Mount Sinai Seaver Autism Center for Research and Treatment Laboratory of Joseph Buxbaum
9/2015 – 8/2020	**Post-doctoral Research Associate** Washington University in St. Louis School of Medicine Department of Genetics Laboratories of Jeffrey Milbrandt and Robi Mitra
9/2010 – 8/2015	**Graduate Student** University of California, Santa Barbara Neuroscience Research Institute Laboratory of Kenneth Kosik
7/2008 – 8/2010	**Research Technician** Brigham and Women's Hospital Division of Renal Medicine Laboratory of Benjamin Humphreys

HONORS & AWARDS

2021	NARSAD 2021 Young Investigator Award
2021	Seaver Faculty Scholar Award
2015 – 2018	Post-doctoral Fellowship (T32), Washington University
2015	Keystone Symposium Travel Award

2012	Advanced Gene Mapping Course Travel Award, Rockefeller University
2010	Deans Fellowship, UCSB

SELECT PUBLICATIONS

1. **Lalli MA**, Yen A, Thopte U, Dong F, Moudgil A, Chen X, Milbrandt J, Dougherty J, Mitra R. Measuring transcription factor binding and gene expression using barcoded self-reporting transposon calling cards and transcriptomes. *Nucleic Acids Research: Genomics and Bioinformatics* (in press) (2022)

2. **Lalli MA**, Commission on Novel Technologies for Neurodevelopmental Copy Number Variants, Shaw B. Neurodevelopmental copy-number variants: A roadmap to improving outcomes by uniting patient advocates, researchers, and clinicians for collective impact. *American Journal of Human Genetics* 109:1353–1365 (2022)

3. Sanchez-Priego C, Hu R, Boshans LL, **Lalli MA**, Janas JA, Williams SE, Dong Z, Yang N. Mapping cis-regulatory elements in human neurons links psychiatric disease heritability and activity-regulated transcriptional programs. *Cell Reports* 39 (2022)

4. Cuddleston WH, Li J, Fan X, Kozenkov A, **Lalli MA**, Khalique S, Dracheva S, Mukamel EA, Breen MS. Cellular and genetic drivers of RNA editing variation in the human brain. *Nature Communications* 13:2997 (2022)

5. **Lalli MA***, Langmade JS, Chen X, Fronick CC, Sawyer CS, Burcea LC, Wilkinson MN, Fulton RS, Heinz M, Buchser WJ, Head RD, Mitra RD, Milbrandt J. Rapid and Extraction-Free Detection of SARS-CoV-2 from Saliva by Colorimetric Reverse-Transcription Loop-Mediated Isothermal Amplification. *Clinical Chemistry* 67:415–424 (2021)
   *Corresponding author

6. **Lalli MA**, Avey D, Dougherty JD, Milbrandt J, Mitra RD. High-throughput single-cell functional elucidation of neurodevelopmental disease–associated genes reveals convergent mechanisms altering neuronal differentiation. *Genome Research* 30:1317–1331 (2020)

7. Moudgil A, Wilkinson MN, Chen X, He J, Cammack AJ, Vasek MJ, Lagunas T, Qi Z, **Lalli MA**, Guo C, Morris SA, Dougherty JD, Mitra R. Self-reporting transposons enable simultaneous readout of gene expression and transcription factor binding in single cells. *Cell* 182: 992-1008 (2020)

8. Bramley JC, Waligorski JE, Kremitzki CL, Liebeskind MJ, Yenkin AL, Xu XE, **Lalli MA**, O'Halloran JA, Mudd PA, House SL, Mitra RD, Milbrandt JD, Buchser WJ. Low-Cost Manually Assembled Open Source Reader for Isothermal Pathogen Detection from Saliva using RT-LAMP: SARS-CoV-2 Use Case. *medRxiv* (2020)

9. Chang-Panesso M, Kadyrov FF, **Lalli MA**, Wu H, Ikeda S, Kefaloyianni E, Abdelmageed MM, Herrlich A, Kobayashi A, Humphreys BD. FOXM1 drives proximal tubule

proliferation during repair from acute ischemic kidney injury. *J Clin Invest* 129:5501–5517 (2019)

10. Jang J, Wang Y, **Lalli MA**, Guzman E, Godshalk SE, Zhou H, Kosik KS. Primary Cilium-Autophagy-Nrf2 (PAN) Axis Activation Commits Human Embryonic Stem Cells to a Neuroectoderm Fate. *Cell* 165: 410–420 (2016)

11. **Lalli MA**, Jang J, Park JHC, Wang Y, Guzman E, Zhou H, Audouard M, Bridges D, Tovar KR, Papuc SM, et al. Haploinsufficiency of BAZ1B contributes to Williams syndrome through transcriptional dysregulation of neurodevelopmental pathways. *Human Molecular Genetics* 25: 1294–1306 (2016)

12. Bettcher BM, Fitch R, Wynn MJ, **Lalli MA**, Elofson J, Jastrzab L, Mitic L, Miller ZA, Rabinovici GD, Miller BL, Kao AW, Kosik KS, Kramer JH. MCP-1 and eotaxin-1 selectively and negatively associate with memory in MCI and Alzheimer's disease dementia phenotypes. *Alzheimers Dement* 3:91–97 (2016)

13. **Lalli MA**, Bettcher BM, Arcila ML, Garcia G, Guzman C, Madrigal L, Ramirez L, Acosta-Uribe J, Baena A, Wojta KJ, et al. Whole-genome sequencing suggests a chemokine gene cluster that modifies age at onset in familial Alzheimer's disease. *Molecular Psychiatry* 20: 1294–1300 (2015)

14. Srikanth P, Han K, Callahan DG, Makovkina E, Muratore CR, **Lalli MA**, Zhou H, Boyd JD, Kosik KS, Selkoe DJ, Young-Pearse TL. Genomic DISC1 Disruption in hiPSCs Alters Wnt Signaling and Neural Cell Fate. *Cell Reports* 12:1414–1429 (2015)

15. Wen Z, Nguyen HN, Guo Z, **Lalli MA**, Wang X, Su Y, Kim N-S, Yoon K-J, Shin J, Zhang C, et al. Synaptic dysregulation in a human iPS cell model of mental disorders. *Nature* 515: 414–418 (2015)

16. **Lalli MA**, Cox HC, Arcila ML, Cadavid L, Moreno S, Garcia G, Madrigal L, Reiman EM, Arcos-Burgos M, Bedoya G, et al. Origin of the PSEN1 E280A mutation causing early-onset Alzheimer's disease. *Alzheimers Dement* 10: S277-S283.e10 (2014)

17. Jang J, Wang Y, Kim H-S, **Lalli MA**, Kosik KS. Nrf2, a regulator of the proteasome, controls self-renewal and pluripotency in human embryonic stem cells. *Stem Cells* 32:2616–2625 (2014)

18. Grgic I, Krautzberger AM, Hofmeister A, **Lalli MA**, DiRocco DP, Fleig SV, Liu J, Duffield JS, McMahon AP, Aronow B, Humphreys BD. Translational profiles of medullary myofibroblasts during kidney fibrosis. *J Am Soc Nephrol* 25:1979–1990 (2014)

19. Kusaba T, **Lalli MA**, Kramann R, Kobayashi A, Humphreys BD. Differentiated kidney epithelial cells repair injured proximal tubule. *Proc Natl Acad Sci USA* 111: 1527–1532 (2014)

20. **Lalli MA**, Garcia G, Madrigal L, Arcos-Burgos M, Arcila ML, Kosik KS, Lopera F. Exploratory data from complete genomes of familial Alzheimer disease age-at-onset outliers. *Human Mutation* 33: 1630–1634 (2012)

INVITED LECTURES & PRESENTATIONS

2022	26th Annual Advances in Autism Conference, New York
2021	The BRAIN Foundation: Synchrony 2021
2021	INSAR 2021
2021	Moving Mountains 2021, Denver
2019	Hope Center for Neurological Disorders Annual Retreat, St. Louis
2015	Keystone Symposium, Neuro-epigenetics, Santa Fe
2014	ISSCR 12th Annual Meeting Vancouver (Poster)
2013	SfN Neuroscience 2013, San Diego

TEACHING & MENTORSHIP

2022	Primary Mentor, Seaver Undergraduate Research Program
2021 – Present	Primary Mentor, Full-time Research Associate
2021	Co-mentor, Graduate Student
2020 – 2021	iPSC Disease Modeling Work in Progress Seminar, Organizer
2019 – 2020	Primary Mentor, Undergraduate Researcher
2013 – 2014	UCSB 140L – Recombinant DNA, Teaching Assistant

GRANTS

2023 – 2025	R21 (Submitted) POINT-MAP: Pooled Optical Imaging, Neurite Tracing, and Morphometry Across Perturbations
2022 – 2024	NARSAD Young Investigator Award (PI)
2021 – 2023	Brain Foundation (Co-investigator)
2021 – 2023	Seaver Faculty Scholar Award (PI)
2019 – 2020	Washington University IDDRC Immediate Pilot Funding