CURRICULUM VITAE
ALEXANDER L MARKOWITZ, PHD
2024

PERSONAL INFORMATION:

Work
Children's Hospital Los Angeles
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Home
8636 W Olympic Blvd 3
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Citizenship: USA

EDUCATION AND PROFESSIONAL APPOINTMENTS

EDUCATION:

2020 *PhD, Neuroscience, University of Southern California, Los Angeles*
2013 *BS, Biological Sciences, University of Maryland, College Park*

POST-GRADUATE TRAINING:

2020-2022 *Post-doctoral, Cancer Data Science, Paul Boutros, Human Genetics, Univesity of California, Los Angeles*

LICENSURE, CERTIFICATIONS

SPECIALTY CERTIFICATION:

2022 *Microsoft Certified: AZ-900*

HONORS, AWARDS:

2024	*Clinical Services Dissemination Scholarship*	*CHLA*
2024	*Institute for Nursing and Interprofessional Research (INIR) Fellowship Award*	*CHLA*
2021	*UCLA Institute for Quantitative & Computational Bioscience Training Award*	*UCLA*
2020,2018	*Neuroscience Graduate Program Symposium Award*	*USC*
2016-2018	*Hearing and Communication Neuroscience Training Grant Award (T32)*	*USC*
2017	*Zach Hall Award*	*USC*
2009-2013	*Dean's list x4, University of Maryland*	*UMD*

TEACHING

DIDACTIC TEACHING:

University of Southern California

2020	*BISC407*	*4 units*	*Teaching Assistant*
2019	*NSCI525*	*4 units*	*Teaching Assistant*
2018	*NSCI524*	*4 units*	*Teaching Assistant*

UNDERGRADUATE MENTORSHIP:

2023-2024	*Mentor*	*USC Bridge Undergraduate Science Research Program*	*Undergraduate Research Mentor*

SERVICE

DEPARTMENT SERVICE:

2024-	*Member, Data & AI Architecture Stardards and Review Board (DARBy)*	*CHLA*
2023-2024	*Member, Data Integration Team*	*CHLA*

PROFESSIONAL SOCIETY MEMBERSHIPS:

2020-2022	*UCLA Institute of Quantitative and Computational Biosciences Collaboratory*
2017-2019	*Association of Research in Otolaryngology*
2014-2020	*USC Neuroscience Graduate Forum*

UNIVERSITY SERVICE:

2016-2017	*Vice President*	*USC Neuroscience Graduate Forum*	*Vice President*

RESEARCH AND SCHOLARSHIP

MAJOR AREAS OF RESEARCH INTEREST

Research Areas

1. Translational Informatics
2. Digital Pathology

GRANT SUPPORT - CURRENT:

3P30CA014089-47S1 (Lerman) *03/01/2024-03/01/2025*
National Cancer Institute *20 Percent*
Administrative Supplements for P30 Cancer Centers Support Grants (CCSG) to Enhance the Utility of Data Available through the Childhood Cancer Data Initiative (CCDI) Ecosystem.

Collaborated with the USC Norris Comprehensive Cancer Center and Children's Hospital Los Angeles to contribute genomic, clinical, and imaging data to the NCI's Childhood Cancer Data Initiative (CCDI). Led efforts to develop MAD4PO, a cloud-based, AI-powered diagnostic tool for pediatric cancers, integrating whole-slide imaging and molecular data to enhance diagnostic accuracy and accessibility globally.
Key Personnel
$500,000

Sanford Children's Genomic Medicine Consortium (Chamala) *01/01/2025-12/31/2025*
5 Percent
An AI-Enhanced Strategy for Interactive Genetic Test Education and Consenting in Pediatrics.

Establish a comprehensive knowledgebase and develop an AI-driven model for pediatric genomic testing and consenting.
Role: Key Personnel
$125,000

GRANT SUPPORT - PAST:

American Otological Society Research Fellowship (Markowitz) *07/01/2018-06/30/2019*

American Otological Society *80 Percent*

The role of ion channels in encoding sound-intensity at the auditory nerve.
This fellowship was used to fund research to understand the mechanisms by which cochlear inner hair cells and spiral ganglion neurons encode sound information.
Role: PI

T32DC009975-07 (Bottjer) *07/01/2016-06/30/2018*

National Institutes of Health *50 Percent*

Hearing and Communication Neuroscience Training Grant
The program will prepare scientists to address fundamental questions pertaining to hearing and communication neuroscience.
Role: Trainee

THESIS:

2020	*PhD, Neuroscience*	*University of Southern California*	*Physiology of the Inner Ear: The role of the biophysical properties of spiral ganglion neurons in encoding sound intensity information at the auditory nerve*

PUBLICATIONS:

CLINICAL COMMUNICATION: (CASE REPORTS, LETTERS)

Chapman N, Greenwald J, Suddock J, Xu D, **Markowitz AL**, Humphrey M, Cotter JA, Krieger MD, Hawes D, Ji. Clinical, pathologic, and genomic characteristics of two pediatric glioneuronal tumors with a CLIP2::MET fusion. *Acta Neuropathol Commun.* 12(1):63. 2024 Apr 22. PMID: 38650040 PMCID: PMC11036580
Collaborated on clinical evaluation of methylation profiles in pediatric oncology case studies.

REFEREED JOURNAL ARTICLES:

Mehta B, Ke J, Zhang L, Baden AD, **Markowitz AL**, Nayak S, Briggman KL, Zenisek D, Singer JH. Global Ca2+ signaling drives ribbon-independent synaptic transmission at rod bipolar cell synapses. *J Neurosci.* 34(18):6233-44. 2014 Apr 30. PMID: 24790194 PMCID: PMC3003811
Conducted a patch-clamp electrophysiological assessment for study design.

Choi H, Zhang L, Cembrowski MS, Sabottke CF, **Markowitz AL**, Butts DA, Kath WL, Singer JH, Riecke H. Intrinsic bursting of AII amacrine cells underlies oscillations in the rd1 mouse retina. *J Neurophysiol* 112(6):1491-504. 2014 Sep 15. PMID: 25008417 PMCID: PMC4137253
Conducted a patch-clamp electrophysiological assessment for study design.

Menendez L, Trecek T, Gopalakrishnan S, Tao L, **Markowitz AL**, Yu HV, Wang X, Llamas J, Huang C, Lee J, Kalluri R, Ichida J, Segil N. Generation of inner ear hair cells by direct lineage conversion of primary somatic cells. *eLife* 9:e55249. 2020 Jun 30. PMID: 32602462 PMCID: PMC10244450
Conducted a patch-clamp electrophysiological assessment for study design.

Markowitz AL, Iyer MR, Kalluri R. Patch-clamp Recordings and Single Fiber Labeling from Spiral Ganglion Somata in Acutely Prepared Semi-intact Cochleae from Neonatal Rats. *Bio-protocol* 12(1):e4281. 2022 Jan 05. PMID: 35118173

Contributed technical details to patch-clamp electrophysiology from dissertation research. Study conceptualized by Dr. Radha Kalluri.

Markowitz AL, Kalluri R. Gradients in the biophysical properties of neonatal auditory neurons align with synaptic contact position and the intensity coding map of inner hair cells. *eLife* 9:e55378. 2020 Jul 8. PMID: 32639234 PMCID: PMC10244450.
Dissertation focused on using patch-clamp electrophysiology to study auditory neurophysiology.

Tebon PJ*, Wang B*, **Markowitz AL***, Davarifar A, Tsai BL, Krawczuk P, Gonzalez AE, Sartini S, Murray GF, Nguyen HT, Tavanaie N, Nguyen TL, Boutros PC, Teitell MA, Sorgani A. Drug screening at single-organoid resolution via bioprinting and interferometry. *Nat Commun* 14, 3168. 2023 June 06. PMID: 37280220
Co-first authored publication. Led statistical analysis of bioinformatic profiles for bioprinted organoids.

Fox NS, Tian M, **Markowitz AL**, Haider S, Li CH, Boutros. iSubGen generates integrative disease subtypes by pairwise similarity assessment. *Cell Rep Methods* 4(11):100884. 2024 Nov 18. PMID: 39447572
Member of development team for bioinformatics software package. Conducted comprehensive benchmarking of the software using diverse external clinical and research datasets.

JOURNAL ARTICLES SUBMITTED:

Markowitz AL, Ostrow DG, Yen C, Gai X, Cotter JA, Ji J. Machine-learning operations streamlined clinical workflows of DNA methylation-based CNS tumor classification. medRxiv. 2024 Jan 25. https://doi.org/10.1101/2024.01.25.24301176

Dharmadhikari AV, **Markowitz AL**, Han J, Estrine DB, Ma K, Fong C, Fernandez BA, Deardorff M, Schmidt R, Ji J, Raca G. Optical genome mapping improves clinical interpretation of constitutional copy number gains and reduces their VUS burden. (under review).

Hahn E, Dharmadhikari AV, **Markowitz AL**, Estrine DB, Quindipan C, Maggo S, Sharma A, Lee B, Maglinte D, Shams S, Deardorff M, Biegel JA, Gai X, Sun M, Schmidt RJ, Raca G, Ji J. Concurrent copy number variant analysis improves diagnostic yield in a diverse cohort of pediatric patients undergoing clinical constitutional exome sequencing. (under review).

JOURNAL ARTICLES INPREPARATION:

Markowitz AL, Munugula C, Christodoulou E, Ji J, Xu L, Cotter JA, Yellapantula V. Genome-wide cfDNA fragmentation patterns in cerebrospinal fluid informs medulloblastoma subtypes. (in preparation).

Markowitz AL, Suddock J, Castaneda E, Ji J, Tamrazi B, Bluml S, Cotter JA. Multi-modal assessment of choroid plexus tumors reveals interdisciplinary associations can identify pathological grade and molecular subtype. (in preparation).

Markowitz AL, Hakimjavadi H, Cotter JA, Chamala S. Automated extraction of genomic data from pathology reports: A comparative analysis of chamelot, machine-learning, and GPT methods. (in preparation).

ABSTRACTS AND PRESENTATIONS:

Markowitz AL, Kalluri R. The role of ion channel properties of type I spiral ganglion neurons for intensity coding. Gordon Conference for Auditory Research. 2016. Abstract.

Markowitz AL, Kalluri R. Spatial gradients in the biophysical and morphological development of Type I spiral ganglion neurons. Association for Research in Otolaryngology. 2017. Abstract.

Markowitz AL, Kalluri R. The biophysical properties of morphologically identified spiral ganglion neurons. Association for Research in Otolaryngology. 2018. Abstract.

Markowitz AL, Kalluri R. Auditory neurons' biophysical properties are correlated with their terminal position along the base of the inner hair cell. Association for Research in Otolaryngology. 2019. Abstract.

Markowitz AL, Boutros PC. A pan-cancer multi-omic analysis of tumor proliferation. UCLA QCBio Research Seminar. 2021 Mar 12. Oral Presentation.

Markowitz AL, Bhardari V, Zhu C, Huang E, Bristrow RG , Boutros PC. A pan-cancer landscape analysis of molecular and functional genomics in tumor proliferation. UCLA QCBio Research Seminar. 2021 Nov 3. Oral Presentation.

Markowitz AL, Boutros PC. A pan-cancer multi-omic analysis of tumor proliferation. UCLA QCBio Research Seminar. 2021 Mar 12. Oral Presentation.

Wang B, Tebon PJ, **Markowitz AL**, Murray GF, Nguyen HT, Tavanaie N, Nguyen TL, Boutros PC, Soragni A, Teitell MA. Functional drug sensitivity screening of bioprinted tumor organoids using high-speed live cell interferometry. 2022 Conference on Lasers and Electro-Optics (CLEO). Abstract.

Wang B, Tebon PJ, **Markowitz AL**, Murray GF, Nguyen H, Tavanaie N, Nguyen TL, Boutros PC, Soragni A, Teitell MA. High-speed live cell interferometry for functional drug sensitivity screening of bioprinted tumor organoids. Interferometry XXI. 2022. Abstract.

Suddock J, **Markowitz AL**, Castaneda E, Ji J, Tamrazi B, Bluml S, Cotter JA. A comprehensive multi-omic diagnostic approach to pediatric choroid plexus tumors. Society for Pediatric Pathology. Oral Presentation.

Markowitz AL, Munugula C, Christodoulou E, Ji J, Xu L, Cotter JA, Yellapantula V. Genome-wide cfDNA fragmentation patterns in cerebrospinal fluid informs medulloblastoma subtypes. New Frontiers in Liquid Biopsies: Data, Technology and Translational Potential. Oral Presentation.

Schmidt RJ, Uchytil J, **Markowitz AL**, Gai X. Enhancing Genetic Testing Report Generation Using Large Language Models and Application Programming Interface Integration. AMP 2024 Annual Meeting & Expo. Abstract.

Zhou S, **Markowitz AL**, Ostrow DG, Schmidt RJ, Li M. Identifying potential diagnostic, prognostic and therapeutic epigenetic biomarkers in pediatric liver cancers. 2024 PPS/SPP Joint Fall Meeting. September 12-14, 2024. Dublin, Ireland. Oral presentation.

Gateau K, Gai X, Ostrow GE, **Markowitz AL**, Pat Levitt. Exploratory analysis of scalable biomarkers of toxic stress in the first year of life. Abstract to be presented at Pediatric Academic Societies (PAS) 2025.

Markowitz AL, Suddock J, Castaneda E, Ji J, Margol A, Tamrazi B, Bluml S, Cotter JA. PATH-06 An integrative multi-modal diagnostic approach to prediatric choroid plexus tumors. Neuro Oncol. 26(Suppl 4):0. 2024 Jun 18. PMCID: PMC11182943