

JOSHUA KAPLAN, PH.D.

Website: <https://wp.wvu.edu/kaplanlab/>

516 High Street MS 9172
Bellingham, WA 98225

I'm an Associate Professor of Behavioral Neuroscience at Western Washington University. My laboratory studies the developmental impacts and therapeutic benefits of cannabis using behavioral, molecular, and electrophysiological techniques.

EDUCATION AND ACADEMIC POSITIONS

Associate Professor

Western Washington University, Psychology Department 2022 - present

Assistant Professor

Western Washington University, Psychology Department 2018 - 2022

Senior Fellow

University of Washington, Department of Pharmacology 2015-2018
Projects: "Cannabidiol treatment and mechanism of symptoms in Dravet Syndrome";
"Physiological mechanism of ABHD6 inhibition in epilepsy treatment"
Mentors: Bill Catterall, Ph.D.; Nephi Stella, Ph.D.

PhD Oregon Health & Science University, Behavioral Neuroscience 2009-2015

Dissertation: "Cerebellar GABAA receptor contributions to alcohol intake and intoxication"
Mentors: David Rossi, Ph.D.; Deborah Finn, Ph.D.

BS Colorado College 2004-2008

B.A. Neuroscience
Thesis: "The effect of brief postnatal exposure to common flame-retardants on cholinergic development and attention in rats"
Advisor: Lori Driscoll, Ph.D.

GRANTS AND RESEARCH AWARDS

NIH R15 AREA Grant (1R15NS141197); \$396,988	2025
RSP Summer Research Grant; \$7000	2024
RSP Undergraduate Research Award, Faculty Advisor; \$750	2024
RSP Undergraduate Research Award (2x), Faculty Advisor; \$1300	2023
RSP Manuscript Preparation Grant (2x); \$4400	2023
RSP Graduate Research Award, Faculty Advisor; \$1500	2023
RSP Summer Research Grant; \$6000	2022
RSP Undergraduate Research Award, Faculty Advisor; \$500	2021
RSP Graduate Research Award, Faculty Advisor; \$1500	2021
STF Initiative Grant; \$13,883	2020

RSP Undergraduate Research Award, Faculty Advisor; \$500	2020
Research Grant from Prelabs, LLC.; \$28,152	2019
Research Grant from Abstrax Tech; \$8,000	2019
Alcohol and Drug Abuse Institute grant; \$20,000	2017
NIAAA F31 Fellowship (1F31AA022267); \$84,464	2013
Graduate Research Scholars Award, \$25,000	2012
N.L. Tartar Research Fellowship; \$2,000	2011
Ashworth Award; \$680	2010
NIAAA T32 Pre-doctoral training grant; \$25,000 annually (3 years)	2010
NIH T32 Multidisciplinary Training in Neuroscience; \$20,000	2009
Figge-Bourquin Premedical Grant; \$3,000	2007

HONORS AND AWARDS

WWU's Peter J. Elich Teaching Award nominee	2022, 2024
High Times Top 100 Most Influential People in Cannabis	2018
CHDD Biological Basis of Autism Poster Symposium Award winner	2016
Elected speaker at 2015 School of Medicine Hooding Ceremony	2015
Data Blitz Presentation Award – NIDA Retreat	2015
3-Minute Thesis People's Choice Award	2015
OHSU School of Medicine Paper of the Year by a Graduate Student Award	2014
Behavioral Neuroscience's Graduate Student Paper of the Year Award	2014
Data Blitz Presentation Award – Vole Meeting	2014
Oral Presentation Award – OHSU Research Week	2014
Runner-up for Excellence in Journalism Award – OHSU	2013
Oral Presentation Award – OHSU Research Week	2012
Data Blitz Presentation Award – NIDA Retreat	2011
Arnold B. Scheibel Neuroscience Award (outstanding senior in neuroscience)	2008

RESEARCH EXPERIENCE

Western Washington University, Bellingham, WA 2018-Present

Principal investigator – Behavioral Neuroscience Program, Psychology Department

- Animal behavior: learning/memory, anxiety, locomotor, social interaction, nociception
- Slice electrophysiology: whole-cell patch clamp, local field potentials
- Western Blot
- Confocal microscopy
- MALDI-TOF mass spectrometry

University of Washington, Seattle, WA 2015-2018

Postdoctoral Fellowship – Department of Pharmacology, PI: Bill Catterall, Ph.D.; Co-PI: Nephi Stella, Ph.D.

- *Ex vivo* patch-clamp electrophysiology (mice)
- Animal behavior: cognitive, locomotor, and social-based assays

- AAV-driven Cre injections
- Genotyping

Oregon Health & Science University, Portland, OR 2009-2015

Graduate student – Department of Behavioral Neuroscience, PI: David Rossi, Ph.D.

Project: Cerebellar GABAA receptor contributions to alcohol consumption phenotypes

- *Ex vivo* patch-clamp electrophysiology (mice, rats, and prairie voles) in acutely prepared brain slices; cerebellum, hippocampus, striatum, forebrain
- Brain dissection
- Immunohistochemistry

Oregon Health & Science University, Portland, OR 2014-2015

Graduate student – Department of Veterans Affairs, PI: Deborah Finn, Ph.D.

Project: Cerebellar contributions to alcohol intake in mice

- Alcohol consumption behavioral assays in mice
- Stereotaxic-guided cannula implantation and pharmacological microinjections

Oregon Health & Science University, Portland, OR 2010

Graduate student – Department of Behavioral Neuroscience, PI: Suzanne Mitchell, Ph.D.

Project: Exercise on impulsive decision making and drug seeking in rats

- Delayed discounting impulsivity task in rats
- Stereotaxic-guided multiple cannula implantation surgeries
- *In vivo* microdialysis

Oregon Health & Science University, Portland, OR 2009-2010

Graduate student – Department of Veterans Affairs, PI: Charles Meshul, Ph.D.

Project: Exercise on nicotine rescue of Parkinson's symptoms in mice

- Locomotor behavioral assays
- *In vivo* microdialysis
- Stereotaxic-guided cannula implantation surgery

Colorado College, Colorado Springs, CO 2007-2008

Undergraduate researcher – Department of Psychology, PI: Lori Driscoll, Ph.D.

Project: Impact of exposure to flame-retardant chemicals on cholinergic development and attention in rats

- 5-choice serial reaction attention task
- Unbiased stereology
- Immunohistochemistry
- Cryostat

TEACHING EXPERIENCE (INSTRUCTOR OF RECORD)

Western Washington University, Bellingham, WA 2018 – present
Assistant and Associate Professor, Department of Psychology, Behavioral Neuroscience Program

- Foundations in Behavioral Neuroscience (BNS 197)
- Behavioral Neuroscience (PSY 220)
- Experimental Approaches to Research (PSY 303, BNS 301)
- Experimental Methods and Neuroscience Communication (BNS 302)
- Motivation (PSY 322)
- Psychopharmacology (PSY 323)
- Cellular and Molecular Neuroscience (BNS 305)
- Systems Neuroscience (BNS 306)
- Advanced Techniques in Behavioral Neuroscience: Electrophysiology (BNS 428)

Total number of undergraduate student lab members (current and past members): 54

- 5 students received RSP Undergraduate Research Grants (\$500-750 each)
- 3 students received Blackwell/Goldman Summer Research Fellowships (\$6,000 each)

Total number of graduate student lab members (current and past members): 3

Masters Students Advised

Brennen Risch, Experimental Psychology MA candidate: “Cannabidiol’s protective effects against social anxiety and subordinate behavior induced by early-life adversity”; Awarded RSP Graduate Research Grant (2021) - \$1500

Taylor McGillis, Experimental Psychology MA candidate: “Protective effects of CBD and beta-caryophyllene against neurodevelopmental changes caused by early life stress”; Awarded RSP Graduate Research Grant (2023) - \$1500

Seattle University, Seattle, WA 2017

Visiting Adjunct Instructor, Department of Biology

- Course: Neurobiology (BIO 3820)
- Developed curriculum, assignments, and assessments
- Incorporated active learning techniques into a traditional lecture format
- 3 classes/week; 23 students

University of Portland, Portland, OR 2014

Visiting Adjunct Faculty, Department of Psychology

- Course: Neurobiology of Motivated Behaviors (PSY 380)
- Created an entirely new course curriculum
- Developed syllabus, assessments, modules
- 2 classes/week; 17 students

Lewis & Clark College, Portland, OR 2014

Visiting Adjunct Course Instructor, Department of Psychology

- Course: Statistics I (PSY 200)
- Created course materials and lectures
- Inferential statistics for psychology majors and social science majors
- 2 classes/week; 32 students

- Course: Brain & Behavior (PSY 280)
- Determined curriculum for an introduction to neuroscience
- Created lectures, syllabi, assessments
- 2 classes/week; 25 students

PUBLICATIONS

Primary Publications

- Wagner, J.K., Gambell, E., Gibbons, T., Martin, T.J., & **Kaplan, J.S.** (2024). Sex differences in the anxiolytic properties of common cannabis terpenes, linalool and β -myrcene, in mice. *Neurosci*, *5*, 635-649
- Staben, J., Koch, M., Reid, K., Muckerheide, J., Gilman, L., McGuinness, F., Kiesser, S., Oswald, I.W.H., Koby, K.A., Martin, T.J., & **Kaplan, J.S.** (2023). Cannabidiol and cannabis-inspired terpene blends have acute prosocial effects in the BTBR mouse model of autism spectrum disorder. *Frontiers in Neuroscience*, *17*.
- Aychman, M.M., Goldman, D.L., & **Kaplan, J.S.** (2023). Cannabidiol's neuroprotective properties and potential treatment of traumatic brain injuries, *Frontiers in Neurology*, *14*.
- Kaplan, J.S.**, Wagner, J.K., Reid, K., McGuinness, F., Arvila, S., Brooks, M., Stevenson, H., Jones, J., Risch, B., McGillis, T., Budinich, R., Gambell, E., & Predovich, B. (2021). Cannabidiol exposure during the mouse adolescent period is without harmful behavioral effects on locomotor activity, anxiety, and spatial memory. *Frontiers in Behavioral Neuroscience*.
- Kaplan, J.S.**, Stella, N., Catterall, W.C., & Westenbroek, R. (2017). Cannabidiol attenuates seizures and social deficits through enhanced inhibitory neurotransmission in a mouse model of Dravet Syndrome. *PNAS*, 11229-11234.
- Kaplan, J.S.**, Nipper, M.A., Richardson, B.D., Jensen, J., Finn, D.A., & Rossi, D. J. (2016). Pharmacologically counteracting a phenotypic difference in cerebellar GABA_A receptor response to alcohol prevents excessive alcohol consumption in a high alcohol consuming genotype. *Journal of Neuroscience*, *36*, 90199025.
- Kaplan, J.S.**, Mohr, C., Hostetler, C.M., Ryabinin, A.E., Finn, D.A., & Rossi, D.J. (2016). Alcohol suppresses tonic GABA_A receptor inhibition of cerebellar granule cells in the prairie vole: a neural signature of a high alcohol consuming genotype. *Alcoholism: Clinical and Experimental Research*, *40*, 1617-1626.

Kaplan, J.S., Mohr, C., & Rossi, D.J. (2013). Opposite actions of alcohol on GABA_A receptor-mediated currents mediated by nNOS and PKC activity, *Nature Neuroscience*, 16, 1783-1793.*

* Winner of two awards: 1) Department of Behavioral Neuroscience's graduate student Paper of the Year Award, and 2) OHSU School of Medicine Paper of the Year Award by a Graduate Student

Collaborative Publications

Basu, A., Bradaric, B., Donley, D., Guider-Diez, M.M., Grimm, J., **Kaplan, J.S.**, et al. (2024). Proceedings of the 2023 Faculty for Undergraduate Neuroscience workshop at Western Washington University, Bellingham, WA, July 27-30, 2023. *Journal of Undergraduate Neuroscience Education*, 22, E4-E10.

Westenbroek, R., **Kaplan, J.S.**, Viray, K., & Stella, N. (2023). The serine hydrolase ABHD6 controls survival and thermally induced seizures in a mouse model of Dravet Syndrome. *Neurobiology of Disease*, 180.

Erikson, C.M., Douglas, K.T., Thuet, T.O., Richardson, B.D., Mohr, C., Shiina, H., **Kaplan, J.S.**, & Rossi, D.J. (2022). Independent of differences in taste, B6N mice consume less alcohol than genetically similar B6J mice, and exhibit opposite polarity modulation of tonic GABA_AR currents by alcohol. *Neuropharmacology*.

Stein, R.E., **Kaplan, J.S.**, Li, J., & Catterall, W.A. (2019). Hippocampal deletion of Na_v1.1 channels in mice causes thermal seizures and cognitive deficit characteristics of Dravet Syndrome. *PNAS*, 116, 16571-16576.

Cao, J.K., **Kaplan, J.S.**, & Stella, N. (2019). ABHD6: Its place in endocannabinoid signaling and beyond. *Trends in Pharmacological Sciences*, 40, 267-277.

Anderson, K., Williams, E.M., **Kaplan, J.S.**, Matsumura, L., & Troxell, M.L. (2014). Utility of immunohistochemical markers in irradiated breast tissue: An analysis of the role of myoepithelial markers, p53, and Ki-67. *American Journal of Surgical Pathology*, 38, 1128-1137.

McClendon, E., Chen, K., Gong, X., Sharifnia, E., Hagen, M., Cai, V., Shaver, D.C., Riddle, A., Dean, J.M., Gunn, A.J., Mohr, C., **Kaplan, J.S.**, Rossi, D.J., Kroenke, C.D., Hohimer, A.R., & Back, S.A. (2014). Prenatal cerebral ischemia triggers dysmaturation of caudate projection neurons. *Annals of Neurology*, 75, 508524.

Mohr, C., Kolotushkina, O., **Kaplan, J.S.**, Welsh, J., Daunais, J., Grant, K., & Rossi, D.J. (2013). Primate cerebellar granule cells exhibit a tonic GABA_A conductance that is not

affected by alcohol: A possible cellular substrate of the low level of response phenotype. *Frontiers in Neuroscience*, 7, 1-14

Driscoll, L., **Kaplan, J.S.**, Bucuvalas, E., Allen, H., Kraut J., & Fitzpatrick, J. (2012). Acute postnatal exposure to the pentaBDE commercial mixture DE-71 at 5 or 15 mg/kg/day does not produce learning or attention deficits in rats. *Neurotoxicology and Teratology*, 34, 20-26.

Anderson, K., Yamamoto, E., **Kaplan, J.S.**, Hannan, M., & Jacob, B. (2010). NeuroLucida Lucivid versus NeuroLucida camera: A quantitative and qualitative comparison of three-dimensional neuronal reconstructions. *Journal of Neuroscience Methods*, 186, 209-214.

Mohr C. Kolotushkina O., **Kaplan J.S.**, Welsh J.P., & Rossi D.J. (In preparation). Novel NMDA receptor triggered Purkinje cell current contributes to Purkinje cell damage during brain ischemia.

Freelance writing

See <https://wp.wvu.edu/kaplanlab/published-works/> for a complete of published articles

Book chapters

Martig, K., Reid, K., & **Kaplan, J.S.** (2019). 'Emerging Clinical and Mechanistic Support for CBD Treatment of Autism Spectrum Disorder', in *Cannabis as Medicine*. Boca Raton: CRC Press.

PROFESSIONAL TRAINING

<i>Faculty for Undergraduate Neuroscience Summer Workshop</i> (host institution), Bellingham, WA	2023
<i>Advancing Excellence and Equity in Science (AEES)</i> , Bellingham, WA	2020-2021
<i>Student-Centered Teaching Workshop</i> , Bellingham, WA	2018
<i>Diversity Workshop</i> , Seattle, WA	2017
<i>Science Teaching Experience for Postdocs (STEP) Apprenticeship</i> , Seattle, WA	2016-2017
<i>Future Faculty Workshop</i> , Seattle, WA	2016
<i>Diversity and Inclusion in Medical Education</i>	2015

PRESENTATIONS AND INVITED LECTURES (DURING TIME AT WWU)

Prevention and Wellness Services speaker, WWU, Bellingham, WA

- *4/20 talk: High in Mind?* (April 18, 2024)
- *4/20 talk: The Future of Cannabis* (April 20, 2023)
- *4/20 Series* (April 13 and April 20, 2022)
- *Why Goldilocks Avoids Brownies: The science behind how your method of cannabis consumption impacts your brain and your high* (April 20, 2021)
- *Don't forsake the t-break: Learn the science behind cannabis tolerance and recovery during abstinence* (January 30, 2020)
- *Why Goldilocks Matters: The Importance of the Right Dose in Getting High and Achieving Relief* (April 16, 2020)
- *Baked Goods: Learn the science behind how your method of cannabis consumption impacts your high* (April 18, 2019)
- *Potent Pot: Learn how cannabis has evolved to get you higher and how you can minimize your risk* (April 16, 2019)

ADCAS PHE (public health educator) talk, online

Delving into the Weeds: How THC and CBD Interact to Get You High and Provide Relief (October 22, 2020)

Creator's Collide Conference, online

How Interacting with the Cannabis Industry Improves Science and Opens Opportunity (May 22, 2020)

Dean's Lecture Series, City Hall, Bellingham, WA

Cracking the Cannabis Code (May 1, 2019)

Conference Poster Presentations (while at WWU)

Kaplan, J.S., McGillis, T., Muckerheide, J., Leland, W., Veliz, J., Patterson, S., Quinn, G., Daep, J., West, E., Fisher, A., Schneider, N., Tauxe, S., Koch, M. (2024, October, 6). *Optimization of cannabidiol-based medicine and developmental assessment in mice*. Poster session presented at the Society for Neuroscience's Annual Meeting, Chicago, IL.

Staben, J., Koch, M., Reid, K., Gibbons, T., Gilman, L., Muckerheide, J., & **Kaplan, J.S.** (2022, November 15). *Cannabidiol and cannabis terpene blends have acute prosocial effects in the BTBR mouse model of autism spectrum disorder*. Poster session presented at the Society for Neuroscience's Annual Meeting, San Diego, CA.

Stevenson, H., McGillis, T., Wagner, J.K., Reed, K., McGuinness, F., Arvila, S... **Kaplan, J.S.** *Developmental exposure to cannabidiol via intraperitoneal injection or passive inhalation is without substantial behavioral consequences on locomotor behavior, anxiety, and spatial learning in mice*. (Accepted abstract for November 2021). Poster session scheduled to present at the Society for Neuroscience's Annual Meeting, Chicago, IL.

Wagner, J. & **Kaplan, J.S.** (2020, October 25). *Sex differences in the anxiolytic effects of prominent cannabis terpenes: implications for the Entourage Effect*. Virtual poster presentation at the Neuroscience Undergraduate Research Symposium hosted by the Faculty for Undergraduate Neuroscience.

Wagner, J., Reid, K., Brooks, M., Arvila, B., McGuinness, F., Webster, H...**Kaplan, J.S.** (2019, October 23). *Anxiolytic effects of full-spectrum cannabidiol-rich hemp extracts in mice*. Poster session presented at the Society for Neuroscience's Annual Meeting, Chicago, IL.

PROFESSIONAL AFFILIATIONS

Society for Neuroscience, 2009 – present

Faculty for Undergraduate Neuroscience, 2019 – present

PROFESSIONAL SERVICE

Departmental service

Communications Committee (chair), 2022 - present
Faculty and staff hiring committees, 2019, 2020, 2021, 2022, 2023
NeRDS Club faculty advisor, 2019 – present
BNS Program Committee, 2018 – present
PSY Chair's Advisory Council, 2019 – 2020, 2022 – present
PSY Advancement Committee, 2021 – 2022

College/University Service

Science and Technical Services (STS) Advisory Council member, 2019 – present
Pre-Health Advisory Board member, 2022 – present
Students for Sensible Drug Policy (SSDP) faculty advisor, 2020-2023

Other Professional Service

Peer-Reviewed Manuscript reviewer:

- Alcohol: Clinical & Experimental Research
- Neuropharmacology
- Autism in Adults
- Scientific Reports
- Neuroscience

Peer-Reviewed Grant review:

- Murdoch Charitable Trust