Lydia Rader

Curriculum vitae

Postdoctoral Associate
Institute for Behavior Genetics

Email: Lydia.Rader@colorado.edu

EDUCATION

2025 Dual Ph.D., Behavioral, Psychiatric, and Statistical Genetics & Neuroscience,
Institute for Behavioral Genetics, University of Colorado Boulder,
Doctoral Dissertation: Genetically informed approach to disentangle relationships between chronic pain, executive functions, and substance use.
Advisor: Naomi Friedman Ph.D.

2023 M.A., Behavioral, Psychiatric, and Statistical Genetics,
Institute for Behavioral Genetics, University of Colorado Boulder
Master's Thesis: Associations between adolescent pain and psychopathology in the Adolescent Brain Cognitive Development (ABCD) study.
Advisor: Naomi Friedman Ph.D.

2020 MSc, Genes, Environment & Development in Psychiatry & Psychology
Social, Genetic, & Developmental Psychiatry, King's College London
Master's Thesis: Genetic and environmental associations of fatigue, depression, and childhood adversity in a Sri Lankan Twin & Singleton study
Advisors: Helena Zavos Ph.D., Fruhling Rijsdijk Ph.D.

2018 B.A., Psychology
Department of Psychology, George Mason University
One-year abroad at Oxford University
Latin Honors Summa Cum Laude

PUBLICATIONS

Peer-reviewed Journal Articles: 10 publications (first author on 6)

10. Zorina, K. & Bango, C.I., Petre, B., **Rader, L.,** Ceko, M., Wager, T.D., Friedman, N.P., (accepted). *PAIN*. Brain gray matter changes across chronic pain trajectories: MRI evidence from 35,000 individuals.

9. **Rader, L.**, Maes, H.., Friedman, N.P., Gordon, R.L., Lense, M.D., Stallings, M.C., Reynolds, C.A., Gustavson, D.E (online). Adolescent music engagement is associated with less alcohol consumption and substance experimentation 5 to 11 years later: A genetically informative study. *Psychology of Addictive Behaviors* (2026). https://doi.org/10.1037/adb0001152. PMCID: PMC13155363.

8. **Rader, L.**, Zorina-Lichtenwalter, K., Gustavson, D., Wager, T.D., Friedman, N.P. Adolescent pain reports share genetic overlap with adult chronic pain conditions: A polygenic score analysis using the ABCD study. *Journal of Pain, 43,* 106-260 (2026). https://doi.org/10.1016/j.jpain.2026.106260. PMCID: PMC13330033.

7. **Rader, L.,** Zorina-Lichtenwalter, K., Hatoum, A. S., Stallings, M.C., Wager, T.D., Friedman, N.P. Genetic overlap of chronic pain, musculoskeletal-specific pain, substance use disorders, and substance use consumption: Common addiction and substance-specific effects. *Addiction, 121(7),* 1683-1698 (2026). https://doi.org/10.1111/add.70387. PMCID: PMC13155363.

6. **Rader, L.**, Wager, T.D., Friedman, N.P. Chronic pain is specifically associated with updating working memory: A longitudinal twin study. *PAIN*, *166*, 212-221 (2025). https://doi.org/10.1097/j.pain.0000000000003347. PMCID: PMC11750124.

5. Chiesa, S.T., **Rader, L.,** Garfield, V., Foote, I., Friedman, N.P., Suri, S., Smith G.D., Hughes, A.D., Richardson, T.G. Childhood adiposity underlies numerous adult brain traits attributed to midlife obesity. *Brain, 148,* 133-142 (2025). https://doi.org/10.1093/brain/awae198. PMCID: PMC11706278.

4. **Rader, L.,** Reineberg A.E., Petre, B., Wager, T.D., Friedman, N.P. Familial effects account for association between chronic pain and past month smoking. *European Journal of Pain, 28,* 1144-1155 (2024). https://doi.org/10.1002/ejp.2247. PMCID: PMC11269048.

3. **Rader, L.**, Freis, S.M. & Friedman, N.P. Associations between adolescent pain and psychopathology in the Adolescent Brain Cognitive Development (ABCD) study. *Behavior Genetics, 53*, 232-248 (2023). https://doi.org/10.1007/s10519-023-10138-x. PMCID: PMC10246734. ***Institute for Behavioral Genetics Carol Lynch Award for outstanding behavior genetics research**

2. Watts R., **Rader, L.**, Grant, J., Filippi, C.G. Genetic and environmental contributions to subcortical gray matter microstructure and volume in the developing brain. *Behavior Genetics, 53*, 208-218 (2023). https://doi.org/10.1007/s10519-023-10142-1. PMCID: PMC10154259.

1. Feeney M., Duda J., Hiller A., Phillips J., Evers C., Yarab N., Todaro V., **Rader, L.**, Rosenfeld S. Understanding health care needs among Veterans with Parkinson's disease: A survey study. *Frontiers in Neurology, 13*, 924-999 (2022). https://doi.org/10.3389/fneur.2022.924999. PMCID: PMC9405651.

Manuscripts Under Review:

1. **Rader, L.**, Maes, H.., Gustavson, D. (under review). Maladaptive personality domains and music behaviors: dimension-specific associations, familial influences, and implications for mental health. Target Journal: Translational Psychiatry.

2. **Rader, L.**, Maes, H. (under review). Developmental trajectories and etiological overlap of internalizing and externalizing symptoms from 10 to 16.5 years in the ABCD Study. Target Journal: Journal of Child Psychology and Psychiatry.

3. McGhee-Deakin, C.A., Lindley, A., **Rader, L.**, Smolker, H.R., Friedman, N.P. (Under review). Childhood Attention Problems Are Associated with Widespread Structural Differences in Adult Brain Structure: A Longitudinal Co-Twin Control Study. Target Journal: Developmental Cognitive Neuroscience

4. Vilar-Ribo, L., Jennings, M.V., Sallah, A., Jinwala, Z., Meredith, J., Thorpe, H., **Rader, L.**, Courchesne-Krak, N., Niarchou, M., Balbona, J., Johnson, E., Davis, L.K., Hatoum, A., Mallard, T.,

Gustavson, D., Zhou, H., Palmer, A., Savage, J., Kember, R., Sanchez-Roige, S., (under review). *Nature Human Behavior*. Sex-specific Genetic Architecture Comorbidities of Alcohol Use Behaviors.

Book Chapters:

1. **Rader, L.,** Karhadkar, M., Gustavson, D., (under review). Gene and Environment Interplay on Executive Function Across the Lifespan. In K. Marceau & C.R. Beam (Eds.), *The Cambridge Handbook of Developmental Gene-Environment Interplay: A Lifespan Perspective*. Cambridge University Press.

Selected Manuscripts in Preparation:

1. **Rader, L.**, Reynolds, C., Friedman, N. (submitted). Early adolescent pain and substance use initiation across adolescence: A survival and co-twin control study.

2. **Rader, L.** & Howard, A., Friedman, N. (co-author review). Executive function is a stable cognitive trait across adolescence.

3. Karhadkar, M.A., **Rader. L,** Maes, H.M., Friedman, N.P., Lense, M., Reynolds C.A., Gordon, R.L., Gustavson, D.E. (co-author review). Heritability of Activity Engagement in Adolescents and Associations with Reading and Executive Functions

4. **Rader, L.**, McGhee-Deakin, C.A., Howard, A., Friedman, N. (in preparation). Do polygenic scores index developmental change across adolescence and multi-informant perspectives.

5. **Rader, L.**, Johnson, E. (in preparation). Genomic and cell-specific overlaps between chronic pain and sleep problems.

6. **Rader, L.**, Maes, H.., Gustavson, D. (in preparation). Music engagement protects against substance initiation: a prospective survival analysis.

7. Toikumo, S., Davis, C., Khan, Y., Mingjian, S., Gunawan, T., **Rader, L.,** Liu, Y., Chen, S.P., Wang, S.J., International Consortium for Cluster Headache Genetics, Penn Medicine Biobank, Friedman N.P., Wingo, A., Wingo, T., Gray, J.C., Kember, R.L., Renthal, W., Million Veteran Program, Kranzler, H.R. Genome-wide, cross-ancestry meta-analysis of >1.6 million individuals identifies shared and distinct genetic architectures for primary headache disorders.

CONFERENCE PRESENTATIONS

Symposia

2026 **Rader, L.,** Howard, A.K., Castro-De-Araujo L.F.S., Gustavson, D.E., Luciana, M., Madden, P.A.F., Neale, M.C., Wilson S., Friedman N.P. & Maes, H.M. (2026, June) *Genetic and environmental influences on developmental stability and rates of change in internalizing and externalizing symptoms across adolescence*. In Neale, M.C. (Chair) Genes and Time: A Dive Into the Temporal Dynamics of Human Phenotypes [Symposium]. Behavior Genetics Association (BGA) Symposium, Amsterdam, The

Netherlands.

Oral Presentations

2026 **Rader, L.,** Reynolds, C.A. Friedman, N.P. (June, 2026). *Does early pain increase risk of substance initiation in adolescence?* [Oral presentation]. North American Pain School, Montebello, Canada.

2024 **Rader, L.,** Zorina-Lichtenwalter, K., Gustavson, D.E., Wager, T.D., Friedman, N.P. (June, 2024). *Do chronic pain polygenic scores derived in older adults in the U.K. Biobank (UKB) predict adolescent pain reports in the Adolescent Brain Cognitive Development (ABCD) study?* [Oral presentation]. Behavior Genetics Association, London, United Kingdom.

2023 **Rader, L.,** Wager, T.D., Friedman, N.P. (June, 2023). *Working memory is genetically associated with young adult chronic pain: Results from a longitudinal twin study* [Oral presentation]. Behavior Genetic Association Annual Meeting, Murcia, Spain, United States.

Poster Presentations

2026 **Rader, L.,** Stern, E.F., Reynolds, C.A., Keller, M.C., Gordon, R.L., Ph.D., Lense, M.D., Ph.D., Maes, H.H.M., Ellingson, J.M., Vrieze, S., Wilson, S., Rhee, S.H, Gustavson, D.E., (September, 2026). *Maladaptive personality domains and music behaviors: dimension-specific associations, familial influences, and implications for mental health.* [Poster presentation]. Musicality Genomics Consortium, Reykjavik, Iceland.

2023 **Rader, L.,** Zorina-Lichtenwalter, K., Grotzinger, A. D., Friedman, N.P. (October, 2023). *Genetic overlaps between chronic pain, substance use disorders and nucleus accumbens volume.* [Poster presentation]. World Congress of Psychiatric Genetics, Montreal, Canada.

2023 **Rader, L.,** Freis, S.M. & Friedman, N.P. (June, 2023) *Associations Between Adolescent Pain and Psychopathology in the Adolescent Brain Cognitive Development (ABCD) Study* [Poster presentation]. Behavior Genetic Association Annual Meeting, Murcia, Spain, United States. ***Behavior Genetics Association "Rowe" Award for outstanding poster presentation**

2022 **Rader, L.,** Reineberg A.E., Petre, B., Wager, T.D., Friedman, N.P (June, 2022). *Familial effects account for relationship between past month tobacco frequency and presence of a current pain episode* [Poster presentation]. Behavior Genetic Association Annual Meeting, Los Angeles, CA, United States.

<u>PROFESSIONAL & INVITED TALKS</u>

2026 **Rader, L.,** (November, 2026). Understanding adolescent health and behavior through genetically informed research. Invited speaker, Pediatric Pain & Sleep Innovations Lab, University of Washington.

2026 **Rader, L.,** (May, 2026). Understanding adolescent health and behavior through genetically informed research. Invited speaker, Public Health Genetics and Genomics Week, University of Pittsburgh.

2025 **Rader, L.,** Zorina-Lichtenwalter, K., Gustavson, D.E., Wager, T.D., Friedman, N.P. (May, 2025). *Genetic overlap between chronic pain factors and substance use.* [Oral presentation]. Institute for Behavioral Genetics mini-conference, Boulder, CO, United States.

2024 **Rader, L.,** Zorina-Lichtenwalter, K., Gustavson, D.E., Wager, T.D., Friedman, N.P. (May, 2024). *Do chronic pain polygenic scores derived in older adults in the U.K. Biobank (UKB) predict adolescent pain reports in the Adolescent Brain Cognitive Development (ABCD) study?* [Oral presentation]. Institute for Behavioral Genetics mini-conference, Boulder, CO, United States.

2023 **Rader, L.,** Wager, T.D., Friedman, N.P. (May, 2023). *Working memory is genetically associated with young adult chronic pain: Results from a longitudinal twin study* [Oral presentation]. Institute for Behavioral Genetics mini-conference, Boulder, CO, United States.

2022 **Rader, L.,** Reineberg A.E., Petre, B., Wager, T.D., Friedman, N.P. (May, 2022). *Familial effects account for relationship between past month tobacco frequency and presence of a current pain episode* [Oral presentation]. Institute for Behavioral Genetics mini-conference, Boulder, CO, United States.

2019 **Rader, L.,** Rijsdijk, F., Zavos, H. (September, 2019). *Genetic and environmental associations of fatigue, depression, and childhood adversity in a Sri Lankan Twin & Singleton study* [Poster presentation]. King's College London Hospital, London, England.

RESEARCH EXPERIENCE

Research Support as Graduate Student, Postdoctoral Associate

2025-Present **Postdoctoral Associate (80%)**: National Institute on Drug Abuse Grant: *Vulnerability to Substance Use: Transitions and Trajectories in ABCD Youth with Validation Using Longitudinal Twin Family Samples.* (R01 DA063061). University of Colorado Boulder & Virginia Commonwealth University.

2025-Present **Postdoctoral Associate (20%)**: National Institute on Drug Abuse Grant: *Establishing if Music Engagement is a Protective Factor in Adolescent Substance Use Using Existing Longitudinal, Genetic, and Environmental Datasets.* (R01 DA059804). University of Colorado Boulder.

2023-2025 **Graduate Research Assistant**: National Institute for Mental Health Pre-Doctoral Training Grant: *Research Training: Mental Health Behavior Genetics* (T32 MH016880). University of Colorado Boulder.

2021-2023 **Graduate Research Assistant**: *Brain and Genetic Predictors of Individual Differences in Pain and Placebo Analgesia*, University of Colorado Boulder (R01 DA046064).

AWARDS & HONORS

2025	Collegiality and Scholarship Excellence Award: awarded for scholarly focus and contribution, Graduate and Professional Student Government, University of Colorado Boulder
2025	Daniel's Fund Case Competition National Finalist: Selected as a national finalist for essay on the ethics of personalized medicine and AI, Bill Daniel's Fund
2024	Sean E Hudson Leadership Award: awarded for leadership in scientific community, Department of Psychology & Neuroscience, University of Colorado Bolder
2023	Carol Becker Lynch Award: awarded for outstanding behavior genetics research, Institute for Behavioral Genetics
2023	Rowe Award: awarded for outstanding poster presentation, presented at the Behavior Genetics Association Annual Meeting
2018	Phi Beta Kappa, George Mason University

TEACHING EXPERIENCE

2026	Tutor at the International Statistical Genetics Workshop
2024-2025	Assisted in Mentored Honors Thesis project at the University of Colorado Boulder
2024	Grader for the undergraduate Sports Psychology course (PSYC 4541; Spring 2024)
2023	Teaching assistant for the undergraduate Foundations of Neuroscience II lab and developed lab curriculum for the course (NRSC 2125; Fall 2023)
2022	Grader for the undergraduate/graduate Behavioral Neuroendocrinology course (NRSC 4092/5092; Fall 2022)
2022	Teaching assistant for the undergraduate Foundations of Neuroscience I lab and developed lab curriculum for the course (NRSC 2100; Fall 2022)
2022	Teaching assistant for the undergraduate Biological Psychology course (PSYC 2012; Spring 2022)
2021	Teaching assistant for the undergraduate Psychological Science I: Statistics lab (PSYC 2111; Fall 2021)

EMPLOYMENT

2025–Present	Postdoctoral Associate 80% Friedman Lab – University of Colorado Boulder, Boulder, Colorado 20% The Gustavson Lab – University of Colorado Boulder, Boulder, Colorado
2021–2025	Graduate Research Assistant The Friedman Lab – University of Colorado Boulder, Boulder, Colorado

2024–2025 Graduate Research Assistant
The Cooperative Institute for Research in Environmental Sciences – Remote

2021–2022 Data Analyst Internship
The Parkinson's Foundation – Remote

WORKSHOPS

2026 Musicality Genomics Consortium, Reykjavik, Iceland. September 2026

2026 North American Pain School, Montreal, Canada. July 2026

2026 Multi-omics Network Analysis Workshop, Denver, CO. June 2026

2023 International Workshop on Statistical Genetic Methods for Human Complex Traits (Genomic methods), Boulder, CO. March 2023

2022 fMRI Acquisition and Analysis Course, Remote. August 2022

2021 International Workshop on Statistical Genetic Methods for Human Complex Traits (Biometrical methods), Remote. March 2021.

2021 University of Oxford FSL Course, Remote. October 2021.

2019 Summer School Twin Data Analysis Workshop, London, UK. June 2019

SERVICE TO PROFESSION

Consortium Contribution

2026 Hallucino-Genes Consortium: Hallucinogen Use GWASs

2026 Chronic Pain Genomics Consortium: Chronic Pelvic Pain GWASs;

2026 ENIGMA Chronic Pain Working Group: Chronic Pain Brain Structure Parcels

2026 Musicality Genomics Consortium: Singing Skills GWASs; Singing engagement GWASs

Public Scholarship & Invited Articles

2026 **Rader, L.**, & Mirhom, M.. *Substance Use and Performance: How Best to Support Athlete Patients.* Psychiatric Times.

2026 **Rader, L.**, *Helping Children in Pain, and Their Parents, Too: A Conversation with Tonya Palermo*. Pain Research Forum.

Editorial Service

2026 Translational Issues in Psychological Science (TPS) Peer-Reviewer Training Program (update and revision)

Served as a Peer Reviewer for the Following Journals

Genes, Brain, & Behavior
Nature Communications
European Addiction Research
Translational Issues in Psychological Science
PAIN Reports
Journal of Pain Research
Human Genomics
Anesthesiology and Perioperative Science
Psychology, Health, & Medicine
European Journal of Medical Research
European Journal of Public Health

Outreach

2025-Present Contributor to COMUNIDAD. COMUNIDAD aims to establish community partnerships to understand perspectives on genetics, physical health, and cognitive health in Latin or Hispanic adults. Assisted in planning outreach events, including a high school science communication poster event with over 100 high school students. Contributed to grant writing for COMUNIDAD.

2024-2025 Chief Executive Officer for Knowing Neurons, a student-run, volunteer-based neuroscience communication and outreach nonprofit. Managed 8 teams of over 100+ early career scientists from over 40 institutions and spanning over 15 countries. Set up data analytics team resulting in a 91% increase of user engagement, averaging 30,000 engaged users across the world. Engaged with stakeholders from multiple sectors to foster partnerships with national and international organizations, including the British Neuroscience Association. Supported various projects at Knowing Neurons, including translation, outreach, and science policy efforts.

2024-2025 Advocate for American Society of Human Genetics. Participated in Capitol Hill meetings for NIH funding. Rallied at the Rally for Medical Research. Assisted in human genomics education presentation for Congress members. Contributed to Outside Witness Testimony on the importance of human genomic research.

2023-2025 Biopsychology Science Student Council Representative for the American Psychological Association. Participated in Capitol Hill meetings for NIH funding. Assisted with APA convention programming. Revised reviewer training module *Translational Issues for Psychological Science* reviewer training and topic selection. Reviewed grant applications for APA Early Graduate Student Research Award & the APA Summer Undergraduate Psychology Experience in Research Fellowship.

2023-2024 Head of Fundraising for Knowing Neurons, a student-run, volunteer-based neuroscience communication and outreach nonprofit. Drafted, reviewed, and awarded 3 grants totaling over $20,000+ to support youth science outreach work. Projects included a translation project, translating science findings into 6 languages; neuroscience workshops in rural and lower income high schools; and a science policy paper competition for early career scientists

2023-2024 Science Diplomacy Social Coordinator at National Science Policy Network. Organized and facilitated programming for the science diplomacy committee.

PROFESSIONAL MEMBERSHIPS

2026-Present Musicality Genomics Consortium
2026-Present United States Association for the Study of Pain
2026-Present International Association for the Study of Pain
2025-Present ENIGMA Chronic Pain Working Group
2025-Present Chronic Pain Genomics Consortium
2022-Present Behavior Genetics Association
2021-2025 Association for Women in Science
2023-2025 American Psychological Association
2023-2024 American Society of Human Genetics
2023-2024 World Congress of Psychiatric Genetics

REFERENCES

Dr. Naomi Friedman
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Address: University of Colorado Boulder
Institute for Behavioral Genetics
447 UCB
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Dr. Hermine Maes
Email: Hermine.Maes@vcuhealth.org
Address: Virginia Commonwealth University
Virginia Institute for Psychiatric and Behavioral Genetics
800 E. Leigh St.
Richmond, VA 23298

Dr. Daniel Gustavson
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Dr. Helena Zavos
Email: Helena.Zavos@kcl.ac.uk
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