

# Claire Lucia Morrison

Curriculum Vitae  
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## Education:

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*University of Colorado Boulder, Boulder, CO*

*2018-Present*

- Institute for Behavioral Genetics, Department of Psychology & Neuroscience
- Doctoral candidate
- Master of Arts awarded Fall 2020

*University of Michigan, Ann Arbor, MI*

*2013-2016*

- Bachelor of Science with distinction- Biopsychology, Cognition and Neuroscience
- Cumulative GPA 3.69; Biopsychology GPA 3.92
- Minor in Program in the Environment, GPA 3.89
- James B. Angell Scholar and University Honors

## Research Experience:

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*Graduate Student, University of Colorado Boulder, Institute for Behavioral Genetics*

*2018-Present*

- Projects:
  - Latent genetic structure of sleep health and psychiatric disorders.
  - Genome-wide association study (GWAS) of executive functioning and associations with psychopathology.
  - Contributor to a GWAS meta-analysis of nicotine dependence.
  - Contributor to a GWAS meta-analysis of the stop-signal task.
  - Genetic and environmental influences of stressful life events and executive function using longitudinal twin data.
  - Mentor: Naomi Friedman, PhD.
- Programs:
  - R (multiple regression, mixed effects models, Genomic Structural Equation Modeling, OpenMX, data visualization).
  - MPlus (ACE twin analyses, Monte Carlo simulations, multiple mediation models).
  - Python (Linkage Disequilibrium Score Regression, SUPERGENOVA).
  - PLINK (GWAS, genomic data quality control).
  - SAIGE (GWAS).
  - GEMMA (GWAS).
  - BOLT (GWAS, genomic relatedness matrices).
  - Freesurfer (structural and functional neuroimaging analyses and visualization).
  - Flash PCA (principal component analysis of genetic data).
- Awards:
  - National Institute of Mental Health T32 Training Grant awarded July 2019.
  - National Institute of Mental Health T32 Training Grant awarded July 2020.
  - Behavioral Genetics Association Rowe Award recipient 2020.

- National Institute of Mental Health T32 Training Grant awarded July 2021.

*Clinical Research Assistant, University of Michigan, Department of Psychiatry*

2016-2018

· Projects:

- *Dimensional Brain Behavior Predictors for CBT in Anxiety*, PIs: Drs. Kate Fitzgerald, Chris Monk, Emily Bilek, Luan Phan
  - Brain imaging study to assess how Cognitive Behavioral Therapy may change brain function in adolescents with anxiety to serve as a potential target for cognitive training in the future.
  - Participants undergo an extensive clinical assessment, two functional MRI scans, and 12 weeks of therapy.
- *Machine Learning Project for Fear Potentiated Startle in Children*, PIs: Drs. Kate Fitzgerald, Elizabeth Block, Yanni Lui
  - Fear Potentiated Startle assessment of youth through movie clips during EEG.

· Experience:

- Assisted with quality assurance, preprocessing pipelining and analysis of fMRI brain imaging data, such as resetting origins, gray matter segmentation, motion / artifact quality control, checking warp and co-registration.
- Ran fMRI scans on participants aged 7-17 and administered the Multi-Source Interference Task (MSIT) and Emotional Faces Shifting Attention Task (EFSAT).
- Manually scored EEG wave data to be assessed in comparison with the development of a machine learning algorithm.
- Built data bases, managed, cleaned, tracked and performed initial analyses of subject self-report and clinical data.
- Used Matlab- SPM 12, Dpabi, FSL, REDCap, Qualtrics, Eprime 2.0 and Brain Vision Analyzer

*Research Assistant, University of Michigan Neurogenetics & Developmental Psychopathy Lab*

2015-2016

· Projects:

- *Michigan Twin Neurogenetics Study (MTwiNS)*, PI: Dr. Luke Hyde
  - Imaging gene by environment interaction study of twins.
  - Assessments involved: home visits of participants, functional MRI scans, clinical interviews, DNA/RNA collection through saliva and blood samples, cortisol collection through hair samples and a multitude of parent and child self-report questionnaires.
- *Adolescent Wellbeing and Brain Development Study*, PIs: Drs. Chris Monk & Luke Hyde
  - Longitudinal imaging gene by environment study in the Princeton Fragile Families and Adolescent Wellbeing Study.
  - Visits involved assessing home environments of families in Detroit and Toledo, functional MRI scans, clinical interviews, DNA/RNA collection through saliva and blood samples, cortisol collection through hair samples, ice-bucket stress task with cortisol samples, and a multitude of parent and child self-report questionnaires.

· Experience:

- Facilitated fMRI scans, rated environment quality in participant home visits and collected bio-specimen of blood, DNA, RNA and hair.
- Inputted self-report and clinical data on participants' backgrounds, wellbeing and overall health.

**Publications:**

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- Colbert, S.M.C., Funkhouser, S.A., Johnson, E.C., **Morrison, C.L.**, Hoeffler, C., Friedman, N.P., Ehringer, M.A., Evans, L.M. Novel characterization of the multivariate genetic architecture of internalizing psychopathology and alcohol use. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics* 6, 353-366 (2021). DOI: 10.1002/ajmg.b.32874Am J Med.

- Freis, S. M., **Morrison, C.L.**, Lessem, J. M., Hewitt, J. K., & Friedman, N. P. Genetic and Environmental Influences on Executive Functions and Intelligence in the ABCD Study. *Developmental Science*, 25, (2021). <https://doi-org.colorado.idm.oclc.org/10.1111/desc.13150>.
- Freis, S.M., **Morrison, C.L.**, Smolker, H.R., Banich, M.T., Kaiser, R.H., Hewitt, J.K., & Friedman, N.P. Executive Functions and Impulsivity as Transdiagnostic Correlates of Psychopathology in Childhood: A Behavioral Genetic Analysis. *Frontiers in Human Neuroscience*, 16. <https://www.frontiersin.org/articles/10.3389/fnhum.2022.863235>.
- Gustavson, D.E., **Morrison, C.L.**, Mallard, T., Fontanillas, P., Elson, S.L., the 23andMe Research Team, Friedman, N.P., Palmer, A.A., & Sanchez-Roige, S. Executive Function and Impulsivity Predict Distinct Genetic Variance in Externalizing, Internalizing, Thought Disorders, and Cognition: A Genomic Structure Equation Modeling Investigation. (*In prep*).
- Premo, J., Mannella K., Duval, E., Liu, Y., **Morrison, C.L.**, McGinnis, E., Moser, J., Muzik, M., Roseblum, K., Fitzgerald, K. Startle to Neutral, Not Negative Stimuli: A Neurophysiological Correlate of Behavioral Inhibition in Young Children. *Developmental Psychobiology*, 63 (2021). DOI: 10.1002/dev.22120.
- Hatoum, A.S.\*, Winiger, E.\*, **Morrison, C.L.**, Johnson, E., 23andMe Research Team & Agrawal, A. Characterisation of the genetic relationship between the domains of sleep and circadian-related behaviours with substance use phenotypes. *Addiction Biology*, 4 (2022). DOI: 10.1111/adb.13184.
- Hatoum, A.S., **Morrison, C.L.**, Winiger, E.A., Johnson, E.C., Agrawal, A., Bogdan, R. Genetic Liability to Cannabis Use Disorder and COVID-19 Hospitalization. *Biological Psychiatry: Global Open Science*, 1 (2021). <https://doi.org/10.1016/j.bpsgos.2021.06.005>.
- Hatoum, A.S., **Morrison, C.L.\***, Lam, M., Mitchell, E.C., Bencha-Bachman, C.E., Reineberg, A., Evans, L.M., Keller, M.C., Palmer, R.H.C., The Cogent Consortium, Lencz, T., Friedman, N.P. Genome-Wide Association Study Shows that Executive Functioning Is Influenced by GABAergic Processes and Is a Neurocognitive Genetic Correlate of Psychiatric Disorders. *Biological Psychiatry*. <https://doi.org/10.1016/j.biopsych.2022.06.034>.
- Liu, J., Richmond\*, R.C., Anderson\*, E.L., Bowden, J., Barry, C., Dashti, H.S., Daghlas I., Lane, J.M., Kyle, S.D., Vetter, C., Friedman, N.P., **Morrison, C.L.**, Jones, S.E., Wood., A.R., Frayling, T.M., Wright, A.K., Carr, M.J., Anderson, S.G., Emsley, R., Ray, D., Weedon, M.N., Saxena, R., Rutter, M.K., Lawlor, D.A. The Causal Role of Accelerometer-derived Sleep Traits on Glycated Haemoglobin: A Mendelian Randomization Study. (*In prep*).
- **Morrison, C.L.**, Rhee, S.H., Smolker, H.R., Corley, R.P., Hewitt, J.K, Friedman, N.P. Genetic and Environmental Influences on Stressful Life Events and their Associations with Executive Functions in Young Adulthood: A Longitudinal Twin Analysis. *Behavior Genetics* 51, 30-44, (2021). <https://doi.org/10.1007/s10519-020-10017-9>.
- **Morrison, C.L.**, Winiger, E., Rieselbach, M.M., Vetter, C., Wright, K.P., LeBourgeois, M., Friedman, N.P. Latent Genetic Structure of Sleep Health and Psychopathology. *Biological Psychiatry: Global Open Science*. <https://doi.org/10.1016/j.bpsgos.2022.07.002>.
- Winiger, E., Ellingson, J.M., **Morrison, C.L.**, Corley, R.P, Pasma, J.A., Wall, T.L., Hopfer, C.J., Hewitt, J.K., Sleep deficits and cannabis use behaviors: an analysis of shared genetics using linkage disequilibrium score regression and polygenic risk prediction, *Sleep*, 2020.

## Conferences / Workshops:

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*Behavior Genetics Association Annual Conference, Los Angeles*

2022

- **Claire L Morrison.**, Naomi P Friedman. A Multivariate GWAS of Sleep Health.
- Daniel E Gustavson, **Claire L Morrison**, Travis Mallard, Pierre Fontanillas, Sarah L Elson, the 23andMe Research Team, Naomi P. Friedman, Abraham A. Palmer, Sandra Sanchez-Roige. Executive Function and Impulsivity Predict Distinct

Genetic Variance in Externalizing, Internalizing, Thought Disorders, and Cognition: A Genomic Structure Equation Modeling Investigation.

*Behavior Genetics Association Annual Conference, remote*

2021

- **Claire L Morrison**, Matthew C Keller, Chandra A Reynolds, Sally J Wadsworth, Robin P Corely, Naomi P Friedman. Polygenic prediction of cognitive abilities between and within family members.
- Evan A Winiger, Alexander S Hatoum, **Claire L Morrison**, Emma C Johnson, Arpana Agrawal. Genetic identification of sleep vulnerabilities inherited with substance use.
  - Rowe Award recipient

*Institute for Behavioral Genetics Statistical Genetics Workshop, Boulder, CO*

2019, 2020, 2021

- Attended lectures on behavioral genetics theorems and methods such as causes of variation, twin ACE modeling, matrix algebra, multi-level modeling, structural equation modeling.
- Ran scripts for tutorial analyses in R, linux and python.

*Behavior Genetics Association Annual Conference, remote*

2020

- Freis, S.M., **Morrison, C.L.**, Lessem, J.M., Hewitt, J.K., Friedman, N.P. Genetic correlations between executive functions and intelligence in the adolescent brain cognitive development (ABCD) study.
- **Morrison, C.L.**, Winiger, E., Vetter, C., Friedman, N.P. Latent Genetic Structure of Sleep Health and Psychopathology
  - Rowe Award recipient
- Winiger, E.A., Ellingson, J.M., **Morrison, C.L.**, Corley, R.P., Pasman, J.P., Wall, T.L., Hopfer, C.J., Hewitt, J.K. Using genetic correlations and polygenic risk prediction to analyze shared genetics between sleep deficits and cannabis use behaviors.

*Institute for Behavioral Genetics Mini Conference, Boulder, CO*

2019

- **Morrison, C.L.**, Rhee, S.H., Smolker, H.R., Corley, R.P., Hewitt, J.K., Friedman, N.P. Genetic and Environmental Influences of Stressful Life Events and Relations with Executive Function: A Longitudinal Twin Analysis.

*Society of Biological Psychiatry Annual Conference, Chicago, IL*

2019

- Norman, L.J., Taylor, S.F., **Morrison, C.L.**, Radua, J., Kaushal, S., Chevrier, A. Hartman, C. A., Janssen, T.W.P., Lukito, S., Massat, I., Oosterlaan, J., Peigneux, P., Rubia, K., Schachar, R., Sebastian, A., Shaw, P., Sudre, G., Tüscher, O., van Rooij, D., Fitzgerald, K.D. An Image-Based Meta-Analysis of Successful and Failed Stopping in Attention Deficit/Hyperactivity Disorder Using Statistical Parametric Maps.

*American College of Neuropsychopharmacology Annual Conference, Hollywood, FL*

2018

- Norman, L.J., Taylor, S.F., **Morrison, C.L.**, Radua, J., Kaushal, S., Chevrier, A. Hartman, C. A., Janssen, T.W.P., Lukito, S., Massat, I., Oosterlaan, J., Peigneux, P., Rubia, K., Schachar, R., Sebastian, A., Shaw, P., Sudre, G., Tüscher, O., van Rooij, D., Fitzgerald, K.D. Neural Abnormalities During Successful and Failed Stopping in Attention Deficit/Hyperactivity Disorder: A Meta-Analysis Using Whole-Brain Statistical Parametric Maps.

*Association of Behavioral and Cognitive Therapies Annual Conference, Washington DC*

2018

- Hicks, A.M., **Morrison, CL.**, Lowe, R., Synger, A., Piacentini, J., Fitzgerald, K.D., Monk, C.S., Bilek, E.L. Cognitive Restructuring and Exposure Tasks Outperform Relaxation Training and Mentorship in Clinically Anxious Youth.

*Silverman Research Conference, University of Michigan Department of Psychiatry*

2018

- **Morrison, C.L.**, Norman, L.J., Fitzgerald, K.D., Liu, Y., Radua, J., Chye., Y., De Wit., S., Huyser, C., Karahanoglu, I., Luks, T., Manoach, D., Matthews, C., Rubia, K., Suo, C., van den Heuvel, O., Yucel, M., Taylor, SF. Performance Monitoring in Obsessive-Compulsive Disorder: A Meta-Analysis of fMRI Studies Using Whole Brain T-Maps.

*Silverman Research Conference, University of Michigan Department of Psychiatry*

2017

- **Morrison, C.L.** (presenter), Fitzgerald, K., Lui, Y., Taylor, S., Welsh, R. Atypical Development of the Salience Network in Performance Monitoring in Pediatric Obsessive-Compulsive Disorder

*Interface in Psychology, Neuroscience and Genetics Summer Workshop, Washington University, St. Louis* 2016

- Gained introductory skills to statistically analyze the genome using programs such as Plink, R, and Haploview and the basis and benefits of using genetics in research.
- Attended lectures on genetic quality control, analyzing data on related subjects, linkage disequilibrium, polygenic risk scores, haplotype analyses, population stratification and genome-wide association studies.

## **Professional Societies & Mentorship:**

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*Teaching Assistant, Intro to Data Analysis*

*Fall 2022- Spring 2023*

- CU Boulder, graduate level class.
- Teaching frequentist statistics from a linear perspective using R.

*Society for Biological Psychiatry*

*2022-present*

- Student member.

*Behavior Genetics Association*

*2020-present*

- Associate member.

*Undergraduate Research Mentor*

*2020-2022*

- Advised a CU Boulder undergraduate on an honors thesis analyzing sleep and cognitive performance utilizing the Adolescent Brain and Cognitive Development (ABCD) study data.

*Minnesota Community College Class Outreach*

*2020*

- Participated in an interview conducted by an Inver Hills Community College student interested in gaining insight into the research and publication process for a Critical Issues in Human Biology class.

*Huron River Watershed Council, Ann Arbor, MI*

*2017*

- Collected water samples to analyze water chemistry, pH, temperature, stream flow estimation and storm sampling to be used for policy decision making and community outreach.

*Global Brigades- Honduras Medical & Public Health Brigade, University of Michigan, Ann Arbor*

*2014-2016*

- Worked with doctors and physicians to provide medical assessments and relief in a clinic in rural Honduras.
- Educated communities to support public health initiatives and built sustainable water storage, eco-stoves and latrines.

*Detroit Partnership, University of Michigan, Ann Arbor*

*2014-2015*

- Mentored underprivileged children in schoolwork while providing supervised afterschool care in Southwest Detroit.

*Psi Chi, National Honors Society in Psychology, University of Michigan, Ann Arbor Chapter*

*2014-present*