Claire Lucia Morrison, PhD
Curriculum Vitae
clairelm@umich.edu
916-384-8718

Education:

University of Colorado Boulder, *Boulder, CO*   *2018-2023*

- Institute for Behavioral Genetics, Department of Psychology & Neuroscience
- PhD awarded Spring 2023
  - Certificate in Quantitative Methods for Behavioral Sciences
- 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:

Graduate Student, *University of Colorado Boulder, Institute for Behavioral Genetics*   *2018-Present*

- Projects:
  - Disentangling patterns consistent with casualty between sleep and psychiatric domains using Mendelian Randomization and co-twin control methods.
  - Common and unique genetic architecture of sleep health.
  - 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, Mendelian Randomization, OpenMX, data visualization, k-means clustering).
  - MPlus (ACE twin analyses, Monte Carlo simulations, multiple mediation models).
  - Python (Linkage Disequilibrium Score Regression, SUPERGNOVA).
  - 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).

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:

- Colbert, S.M.C., Funkhouser, S.A., Johnson, E.C., **Morrison, C.L.,** Hoeffer, 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.

- Gosling, C.J., Caparos, S., Pinabiaux, C., Schwarzer, G., Rücker, G., Agha, S.S., Alrouh, H., Ambler, A., Anderson, P., Andiarena, A., Arnold, E.L., Arseneault, L., Asherson, P., Babinski, L., Barbati, V., Barkley, R., Barros, A.J.D., Barros, F., Bates, J.E., Bell, L.J., Berenguer, C., Van Bergen, E., Biederman, J., Birmaher, B., Bøe, T., Boomsma, D.I., Brandt, V., Bressan, R.A., Brocki, K., Broughton, T., Bufferd, S.J., Bussing, R., Meng Cao, M., Cartigny, A., Casas, A.M., Caspi, A., Castellanos, F.X., Caye, A., Cederkvist, L., Collishaw, S., Copeland, W.E., Cote, S., Coventry, W.L., Denyer, H., Dodge, K.A., Dogru, H., Efron, D., Eller, J., Elmaksoud, M.A., Ercan, S.E, Faraone, S.V., Michelle Fenesy, M.,Fernández, M.F., Fernández-Somoano, A., Findling, R., Fombonne, E., Fossum, I.N., Freire, C., Friedman, N.P., Mary Frista, Galera, C.,Garcia-Argibay, M.,Garvan, C.S., González, L., Groenman, A.P., Guxens, M., Halperin, J.M., Hamadeh, R.R., Hartman, C.A., Hazell, P., Hill, S.Y., Hinshaw, S.P., Hipwell, A., Hokkanen, L., Holz, N., Íñiguez, C., ,Jahrami, H.A., Jansen, P.W., Jónsdóttir., L.K., Julvez, J., Kaiser, A., Keenan, K.,Klein, D.N., Klein, R.G., Kuntsi, J., Langfus J., Langley, K., Lansford, J.E., Larsen, S.A., Larsson, H., Law, E., Lee, S.S., Lertxundi, N., Li, X., Li, Y., Lichtenstein, P., Liu, J., Lorber, M., Lundervold, A.J., Lundström, S., Marks, D.J., Martin, J., Masi, G., Matijasevich, A., Melchior, M., Moffitt, T.E., Monninger, M., **Morrison, C.L.,** Mulraney, M., Muratori, P., Nguyen, P.T., Nicholson, J.M., Øie, M.G., O'Neill, S., Massimiliano Orri, M., Pan, P.M., Pascoe, L., G.S., Price, J., Rebagliato, M., Riaño-Galán, I., Rohde, L.A., Roisman, G., Rosa, M., Rosenbaum, J.F., G.A., Sammallahti, S., I.S., Schiavone, N.S., Schmid, L., Sciberras, E., Shaw, P., Silk, T., Simpson, J.A., Skogli, E.W., Stepp, S., Strandberg-Larsen, K., Sudre, G., Sunyer, J, Tandon, M., Thapar, A., Thomson, P., Thorell, L.B., Tilling, K., Tinchant, H., Torrent, M., Luciana Tovo, L., Gail Tripp, G., Ukoumunne, O., Van Goozen, S.H.M., Vos, M., Wallez, S., Wang, Y., Westermaier, F.G., Whalen, D., Yoncheva, Y., Youngstrom, E.A.,Sayal, K., Marco Solmi, M., Delorme, R., Cortese, S. Association between relative age at school and persistence of ADHD in prospective studies: a meta-analysis of individual participant data. *In submission.*

- 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 submission.*

- 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 submission.*
- **Morrison, C.L.,** Foote, I., Balbona, J., Rieselbach, M.M., Friedman, N.P. Triangulating across family-based and whole-genome data to assess causal relationships among sleep health and psychiatric disorders. *In prep.*
- **Morrison, C.L.,** Winiger, E., Wright, K.P., Friedman, N.P. Multivariate genome-wide association study of sleep health shows unity and diversity. *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, Pasman, 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.

Awards:

· **Dosier/Muenzinger Award for Outstanding Contribution to Basic Research,** CU Boulder	2022-2023
· **Rowe Award,** Behavior Genetics Association Conference	2020
· **National Institute of Mental Health T32 Training Grant,** CU Boulder	2019-2020
· **National Institute of Mental Health T32 Training Grant,** CU Boulder	2020-2021
· **National Institute of Mental Health T32 Training Grant,** CU Boulder	2021-2022

Conferences / Workshops:

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.

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
- 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 & Volunteer Work:

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   *2022-2023*
- Student member.

Behavior Genetics Association   *2020-2023*
- 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*