

Sophie Breunig

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Education:

University of Colorado Boulder, Boulder, CO

Doctoral Candidate in Psychology and Neuroscience at the Institute for Behavioral Genetics

Supervisor: Dr. Andrew Grotzinger

Aug 2022 – present

University of Colorado Boulder, Boulder, CO

Degree: Master of Science in Behavioral, Psychiatric, and Statistical Genetics

Aug 2022 – Dec 2024

Vrije Universiteit Amsterdam, Amsterdam, Netherlands

Degree: Master of Science in Genes in Behavior and Health, graduated cum laude

Sep 2020 – Jul 2022

University of Konstanz, Konstanz, Germany

Degree: Bachelor of Science in Psychology

Oct 2015 – Sep 2019

Awards and Honors:

Curci Scholarship – Shurl and Kay Curci Foundation

Covering full tuition and stipend including living expenses and conference travel for two years

Aug 2022 – Aug 2024

Research Experience:

Institute for Behavioral Genetics, University of Colorado Boulder, Boulder, CO

Principal Investigator: Dr. Andrew Grotzinger

Investigating the genetic architecture of psychiatric disorders and their genetic overlap with behavioral, health, and medical outcomes with the help of multivariate genomic methods such as genomic SEM and multivariable LD-score regression.

- Extending analyses to a gene expression and functional annotation level to enable research into actionable intervention targets

Aug 2022 – present

Biological Psychology, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

Principal Investigator: Prof. Sara Hart & Dr. Elsje van Bergen

Master Thesis: Parental reports of reading ability: A suitable alternative to established measures and a step towards understanding genetic influences?

- Investigated the degree to which short parental reports of reading ability are phenotypically and genetically correlated with in-person assessments of reading ability

Feb 2022 – Jul 2022

Biological Psychology, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

Principal Investigator: Prof. Dr. AHM Willemsen

Internship Report: Understanding the Relationship of Adolescent and Adulthood Personality with Occupational Choice in a Dutch Twin Family Population

- Investigated the relationship between personality and occupational choice by looking at cross-sectional and longitudinal associations as well as twin pairs discordant for occupational choice
- Analyzed data from the Netherlands Twin Register in R to look at the degree to which the associations are based on genetic and environmental factors

Feb 2021 – Aug 2021

Clinical Neuropsychology, University of Konstanz, Konstanz, Germany

Principal Investigator: Prof. Jens Pruessner

Senior Thesis: The Sonification of Heart Rate Variability

- Designed and conducted experiment on the synchronization of heart rate variability in synchronous and asynchronous tasks in same-gender dyads
- Collaborated with Neuropsychologists and Musicians to analyze and sonify the level of synchrony in heart rate variability using R and SuperCollider

May 2019 – Sep 2019

Center for Anxiety and Related Disorders, Boston University, Boston, MA

Principal Investigator: Prof. Stefan G. Hofmann

Nov 2018 – Apr 2019

Research Intern

- Performed heart rate variability analysis on subjects undergoing exposure treatment for claustrophobia to explore the relationship between heart rate and treatment outcome
- Assessed participants with anxiety disorder for changes in symptoms, medication or treatment and performed ECG and respiratory measurements

iScience Team, University of Konstanz, Konstanz, Germany

Jul 2017 – Sep 2019

Principal Investigator: Prof. Ulf-Dietrich Reips

Research Assistant

- Assisted in the development of a website to create online experiments; tested new versions and presented changes and functionality to other research teams

Teaching Experience:

iScience Team, University of Konstanz, Konstanz, Germany

Jul 2017 – Jul 2020

Teaching Assistant and Teaching Fellow

- Taught several groups of undergraduate students to create and evaluate web experiments with HTML, JavaScript and R
- Provided tutoring for an advanced methodological lecture
- Developed material and presentations for weekly study sessions

Publications:

Peer Reviewed Journal Articles

1. Schaffer, L.S., **Breunig, S.**, Lawrence, J.M. *et al.* Characterizing genetic pathways unique to autism spectrum disorder at multiple levels of biological analysis. *Molecular Autism* **15**, 46 (2024). <https://doi.org/10.1186/s13229-024-00624-2>
2. **Breunig, S.**, Lawrence, J. M., Foote, I. F., Gebhardt, H. J., Willcutt, E. G., & Grotzinger, A. D. (2024). Examining Differences in the Genetic and Functional Architecture of ADHD Diagnosed in Childhood and Adulthood. *Biological Psychiatry Global Open Science* **4** (3). doi: <https://doi.org/10.1016/j.bpsgos.2024.100307>
3. Lawrence, J. M., **Breunig, S.**, Foote, I. F., Tallis, C. B., & Grotzinger, A. D. (2023). Genomic SEM applied to explore etiological divergences in bipolar subtypes. *Psychological Medicine*, 1-8. doi:10.1017/S0033291723002957
4. Hagenbeek, F. A., Hirzinger, J. S., **Breunig, S.**, Bruins, S., Dmitry V. Kuznetsov, D. V., Schut, K., Odintsova, V. V., & Dorret I. Boomsma, D. I. (2023). Maximizing the value of twin studies in health and behaviour. *Nature Human Behaviour*, 7, 849–860. <https://doi.org/10.1038/s41562-023-01609-6>

Manuscripts in Preparation

1. **Breunig, S.**, Younga (Heather) A Lee, Elizabeth W. Karlson, Arjun Krishnan, Jeremy M. Lawrence, Lukas Schaffer, Grotzinger, A. D. Examining the Genetic Links between Clusters of Immune-mediated Diseases and Psychiatric Disorders (under review in *Translational Psychiatry*)
2. Jeremy M. Lawrence, Isabelle F. Foote, **Sophie Breunig**, Luke S. Schaffer, Connor B. Tallis, Travis T. Mallard, Andrew D. Grotzinger; Shared Genetic Liability across Clusters of Psychiatric and Non-psychiatric Medical Illness (under review in *Nature Communications*)
3. Almeida e Sousa, Ines; Grotzinger, Andrew D.; Lawrence, Jeremy M.; **Breunig, Sophie**; Marshall, Charles; Korszun, Ania; Foote, Isabelle Francesca. Examining the Genetic Relationship between Alzheimer's Disease, Schizophrenia and their Shared Risk Factors using Genomic Structural Equation Modelling (under review in *Brain Communications*)
4. **Breunig, S.**, Younga (Heather) A Lee, Elizabeth W. Karlson, Kristen Kelly, Lukas Schaffer, Jeremy Lawrence, Grotzinger, A. D.; Immune Markers Mediate the Genetic Relationships between Immune Diseases and Psychiatric Disorders

Conference Presentations:

1. **Sophie Breunig**, Younga (Heather) A Lee, Elizabeth W. Karlson, Andrew Grotzinger; Immune Markers Mediate the Genetic Relationships between Immune Diseases and Psychiatric Disorders; Poster presentation at World Congress of Psychiatric Genetics, October 2024
2. **Sophie Breunig**, Younga (Heather) A Lee, Elizabeth W. Karlson, Arjun Krishnan, Jeremy M. Lawrence, Lukas Schaffer, Andrew Grotzinger; Examining the Genetic Links between Clusters of Immune-mediated Diseases and Psychiatric Disorders; Oral presentation at Behavior Genetics Association Annual Meeting, June 2024
3. Lukas Schaffer, **Sophie Breunig**, Jeremy M. Lawrence, Isabelle F. Foote, Andrew D. Grotzinger; Characterizing Genetic Pathways Unique to Autism Spectrum Disorder at Multiple Levels of Biological Analysis; Oral presentation by Lukas Schaffer at Behavior Genetics Association Annual Meeting, June 2024

4. **Sophie Breunig**, Jeremy Lawrence, Hannah Gebhardt, Isabelle Foote, Andrew Grotzinger; Examining Differences in the Genetic and Functional Architecture of ADHD Diagnosed in Childhood and Adulthood; Oral presentation at Behavior Genetics Association Annual Meeting, June 2023
5. Jeremy Lawrence, Connor Tallis, **Sophie Breunig**, Isabelle Foote, Andrew Grotzinger; Genomic SEM Applied to Explore Etiological Divergences in Bipolar Subtypes; Oral presentation by Jeremy Lawrence at Behavior Genetics Association Annual Meeting, June 2023

Workshops and Training:

March 2023, March 2024	International Statistical Genetics Workshop	Institute for Behavioral Genetics, University of Colorado, Boulder, USA
May 2024	Rocky Mountain Advanced Computing Consortium High Performance Computing Symposium	Center for Research Data and Digital Scholarship, Boulder, USA
July 2024	Towards a New Science of Mental Disorders: Bridging Evolution and Genetics	The Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Sicily, Italy

Professional Affiliations and Memberships:

Behavior Genetics Association	2022-2024
International Society for Psychiatric Genetics	2024

Service and Mentorship:

Undergraduate mentorship:

Hannah Gebhardt (2023) – Honor's Thesis: Genomic Structural Equation Modeling Offers Insight into Expressive Differences Between Childhood and Late-Diagnosed ADHD: An Analysis of Genetic Overlap with External Traits

Graduate student mentorship:

The International Scholar and Cultural Exchange Program (ISCEP) mentorship (2024):

Organized travel and cultural events and mentored international scholars during their 3-week stay at the International Statistical Genetics Workshop and the Institute for Behavioral Genetics.

Graduate student peer mentoring program (2024):

Mentoring new graduate students in the department in how to navigate transitioning into graduate school.

CU Boulder behavioral neuroscience application assistance program (2024):

Helping prospective international graduate students with the graduate school application process, as well as navigating the visa process and alternative funding sources for international students.

Committee work:

Institute for Behavioral Genetics Data Management Committee: Organizing shared data and scripts.