

*Curriculum Vitae*

**Marissa Ann Smail**

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**EDUCATION**

**University of Cincinnati**, Cincinnati, OH

**Ph.D. Student**, Neuroscience Graduate Program,  
GPA: 4.0/4.0

July 2017 – Present

My graduate research interests broadly center on understanding the mechanisms underlying neuropsychiatric disorders such as anxiety, depression, and loss. In order to elucidate the underlying pathophysiology of these complex disorders, I utilize various strategies such as animal behavioral models, surgical procedures, molecular assays, and bioinformatics analyses to deduce the role of various brain regions, cell types, and environmental manipulations in normal and aberrant stress circuitry.

**Saint Vincent College**, Latrobe, PA

**B.S.**, Biology,  
Summa Cum Laude  
College Scholar of the Honors Program  
Major Concentration: Organismal  
Minor: Psychology  
Overall GPA: 3.993/4.0  
Major GPA: 4.0/4.0

August 2013 – May 2017

My undergraduate research focused on cholinergic regulation of the hypothalamic-pituitary-adrenal (HPA) axis. I designed, conducted, and analyzed multiple projects designed to elucidate the role of specific muscarinic and nicotinic receptors in HPA axis activity, with a particular focus on sex differences.

**RESEARCH EXPERIENCE AND EMPLOYMENT**

**University Graduate Assistantship**

July 2017 – Present

**University of Cincinnati**, Neuroscience Graduate Program

Cincinnati, OH

**Graduate Research**, PI: James Herman, Ph.D.

April 2018 – Present

- Conducting a project to determine the region- and sex-specific molecular basis of loss-induced depression-like behavior in rats utilizing a model of enrichment removal, RNAseq, shotgun proteomics, kinomics, and bioinformatics
- Optimizing simultaneous RNA and protein extractions via ongoing collaboration with Dr. McCullumsmith.
- Experimenting with expanded bioinformatics analyses via ongoing collaborations with CCHMC bioinformaticians.

**Laboratory Rotation**, PI: Robert McCullumsmith, M.D., Ph.D. March 2018 – July 2018

- Experimented with techniques to simultaneously extract RNA and protein from brain micropunches, with the intention of running RNAseq, shotgun proteomics, and kinomics on the same tissue

- Conducted a project to examine alterations in various apoptosis-related factors in post-mortem tissue of patients with schizophrenia
- Collaborated with members of the CCHMC bioinformatics department to learn various techniques to analyze RNAseq data

**Laboratory Rotation, PI: Teresa Reyes, Ph.D.** October 2017 – March 2018

- Assisted with a project that models childhood leukemia in adolescent mice and investigates the effects of early-life cancer and chemotherapy on neuroinflammation and cognitive development
- Investigated the effects of ketogenic diet in the model of childhood leukemia
- Examined gene expression in the prefrontal cortex, hypothalamus, and small intestine of male and female mice to examine acute and chronic changes in inflammation and plasticity
- Conducted operant behavioral tests to study behaviors associated with attention, working memory, and impulsivity

**Laboratory Rotation, PI: Jim Herman, Ph.D.** July 2017 – October 2017

- Conducted a project to investigate the role of glucocorticoid receptor knockdown in the paraventricular nucleus of the hypothalamus of rats and its impact on neuroendocrine stress response. We utilized a combination of novel techniques to achieve this, specifically CRISPR/Cas9 gene editing and viral constructs
- Assisted with research investigating the role of glucagon-like peptide 1 in the bed nucleus of the stria terminalis on stress response and anxiety-like behaviors in mice
- Assisted with research investigating the role of glucocorticoid receptor in the bed nucleus of the stria terminalis on avoidance behaviors and neuroendocrine stress response in mice
- Assisted with piloting and development of various viral mediated strategies to manipulate neuronal function

**Undergraduate Research Assistant** October 2015 – July 2017  
**Saint Vincent College, Biology Department** Latrobe, PA

- Analyzed and compiled previously conducted research on the effects of various cholinergic drugs on rat hypothalamic-pituitary-adrenal axis hormones
- Assisted with laboratory research and conducting data analysis centered around *in vitro* nicotinic stimulation of rat hypothalamic-pituitary-adrenal axis tissues perfused in series
- Instructed students on data analysis methods

**Senior Thesis** November 2015 – May 2017  
**Saint Vincent College, Advisor: Michael Rhodes, Ph.D.** Latrobe, PA

- Title: “The effect of centrally administered muscarinic antagonists on stress hormone responses of the hypothalamic-pituitary-adrenal axis”

**Undergraduate Research Assistant** December 2015 – February 2017  
**Saint Vincent College, Psychology Department** Latrobe, PA

- Assisted with laboratory research centered around behavioral extinction in rats and the relationship between nicotine administration and passive avoidance memory

## **Research Intern**

June 2014 – May 2016

### **Pittsburgh Zoo & PPG Aquarium**

Pittsburgh, PA

- Conducted behavioral research utilizing ethograms on various species including gorillas, clouded leopards, siamangs, and cheetahs
- Designed KidScience (middle school education program) research projects and assisted with research methods education

## **TEACHING EXPERIENCE**

### **Teaching Assistant**

January 2017 – May 2017

#### **Saint Vincent College, Biology Department**

Latrobe, PA

- Assisted with the development of various exercises for a new Neuroscience Lab, including labs pertaining to cricket electrophysiology, mammalian brain dissection, and human emotional responses
- Assisted students with lab work and data analysis

## **SKILLS**

**Laboratory:** Rodent Stereotaxic Surgery (drug injection, viral injection, cannulations), Tail Vein Blood Collection, IP and SC Injections, Restraint, Environmental Enrichment, Elevated Plus Maze, Passive Avoidance, Fixed Ratio, Progressive Ratio, 5-Choice Serial Reaction Time Task, Perfusions, Tissue Collection (brain, heart, thymus, adrenal glands, liver, intestines, ovaries, testes), Brain Sectioning/Mounting, Brain Microdissection and Micropunching, Microscopy (fluorescent, bright field), Dual RNA and Protein Extraction, RT-qPCR, BCA Assay, Western Blotting, Radioimmunoassay, Enzyme Immunoassay, Buffer and Drug Solution Preparation, Ethograms, *In Vitro* HPA Axis Experimentation  
**Computer:** Microsoft Word/Excel/PowerPoint, Biopac, Marvin Sketch, GraphPad Prism, GB-STAT, SPSS, Ethovision, AxioVision, SigmaPlot, R Studio, AltAnalyze, Adobe Illustrator, Database analysis (eg iLINCS)

## **PUBLICATIONS**

Smail M.A., Soles J.L., Karwoski T.E., Rubin R.T., Rhodes M.E. (2018). Sexually diergic hypothalamic-pituitary-adrenal axis responses to selective and non-selective muscarinic antagonists prior to cholinergic stimulation by physostigmine in rats. *Brain Research Bulletin*. 137, 23-34.

## **PRESENTATIONS**

Smail M.A., Wylie C.A., Rhodes M.E., Soles J.L., Czambel R.K., and Rubin R.T. Sexual diergism in rat hypothalamic-pituitary-adrenal axis responses to the selective muscarinic antagonists pirenzepine and methoctramine prior to cholinergic stimulation by physostigmine. *Society for Neuroscience*, (San Diego, CA) SFN ID: 164.12, Nov. 12-16, 2016.

Smail M.A., Morris K.M. The effect of centrally administered muscarinic antagonists on stress hormone responses of the hypothalamic-pituitary-adrenal axis. *Beta Beta Beta Northeast-3 District Convention*, (Frostburg, MD) Apr. 8, 2017.

Smail M.A., Morris K.M. The effect of centrally administered muscarinic antagonists on stress hormone responses of the hypothalamic-pituitary-adrenal axis. *Saint Vincent College 14<sup>th</sup> Annual Academic Conference*, (Latrobe, PA) Apr. 26, 2017.

Smail M.A., Wylie C.A. Rhodes M.E., Noel G.C., Le A.Q., Nichols F.L., Rubin R.T. Sexually diergic *in vitro* hypothalamic-pituitary-adrenal axis activity following *in vivo* continuous nicotine administration and withdrawal. *Society for Neuroscience*, (Washington, DC) SFN ID: 786.23, Nov. 11-15, 2017.

Laaker C.J., Smail M.A., Lloyd K.R., Smith B.L., Konsman J.P., Reyes T.M. Cognitive deficits in survivors of childhood leukemia: development of a mouse model. *University of Cincinnati Gardner Neuroscience Institute/Neurobiology Research Center Research Day*, (Cincinnati, OH) Apr. 17, 2018.

Laaker C.J., Smail M.A., Lloyd K.R., Smith B.L., Konsman J.P., Reyes T.M. Cognitive deficits in survivors of childhood leukemia: development of a mouse model. *Ohio Miami Valley Chapter of the Society for Research Day*, (Miami, OH) May 25, 2018.

Smail M.A., Smith B.L., Funk A., Depasquale E., Sullivan C.R., Bentea E., O'Donovan S.M., Morano R., Hoskins O., Cotella E.M., Mahbod P., Herman J.P., McCullumsmith R.E. A bioinformatics analysis of enrichment loss in rats: molecular mechanisms underlying depression-like behaviors. *University of Cincinnati Graduate Student Research Forum* (Cincinnati, OH) Oct. 25, 2018.

Laaker C.J., Smail M.A., Lloyd K.R., Smith B.L., Konsman J.P., Reyes T.M. Cognitive deficits in survivors of childhood leukemia: development of a mouse model. *Society for Neuroscience*, (San Diego, CA) Nov. 3-8, 2018.

Smail M.A., Smith B.L., Funk A., Depasquale E., Sullivan C.R., Bentea E., O'Donovan S.M., Morano R., Hoskins O., Cotella E.M., Mahbod P., Herman J.P., McCullumsmith R.E. A bioinformatics analysis of enrichment loss in rats: molecular mechanisms underlying depression-like behaviors. *Society for Neuroscience*, (San Diego, CA) SFN ID: 233.17 Nov. 3-8, 2018.

## **HONORS AND AWARDS**

Chancellor's Academic Scholarship (Fall 2013 – Spring 2017)

Wimmer Exam Scholarship (Fall 2013 – Spring 2017)

SVC Alumni Grant (Fall 2013 – Spring 2017)

Saint Vincent College Dean's List (Fall 2013 – Spring 2017)

Frank G. Brooks Award for Excellence in Student Research, Third Place, Beta Beta Beta Northeast-3 District Convention (Spring 2017)

Outstanding Performance on the E.T.S. National Biology Exam (Spring 2017)

Graduate Assistant Scholarship, University of Cincinnati (Summer 2017 – Present)

Certificate of Recognition, First Prize, University of Cincinnati Gardner Neuroscience Institute/Neurobiology Research Center Research Day (Spring 2018)

## MEMBERSHIPS

Saint Vincent College Honors Program (Fall 2013 – Spring 2017)  
Alpha Lambda Delta, Freshman Honors Society (Spring 2013 – Present)  
Beta Beta Beta, Biological Honors Society (Spring 2015 – Present)  
Psi Chi, Psychological Honors Society (Spring 2016 – Present)  
Society for Neuroscience, Graduate Student Member (Summer 2016 – Present)  
Molecular and Cellular Cognition Society (Summer 2017-Present)  
Project Citizen Science, Member (Fall 2017-Present)  
Ohio Miami Valley Chapter of the Society for Neuroscience, Graduate Student Member  
(Spring 2018-Present)  
University of Cincinnati Health Sciences Graduate Association, NGP Co-Representative  
(Fall 2018-Present)  
Yale Ciencia Academy, Fellow (2019 Cohort)

## COMMUNITY SERVICE

<b>Brain Awareness Week/Neuroscience Outreach</b>	Fall 2018 – Present
University of Cincinnati Neuroscience Graduate Program	Cincinnati, OH
<b>KidScience Program Volunteer Teaching Assistant</b>	Fall 2010 – Fall 2016
Pittsburgh Zoo & PPG Aquarium	Pittsburgh, PA
<b>Animal Care Volunteer</b>	Spring 2012 – Fall 2015
Animal Rescue League Wildlife Rehabilitation Center	Verona, PA

## RELEVANT COURSES

**Undergraduate:** General Biology, Intro to Psychology, Cell Biology, Abnormal Psychology, Organic Chemistry, Microbiology, Social Psychology, Comparative Vertebrate Anatomy, Mammalian Physiology, Biological Psychology, Physics, Cognitive Psychology, Biochemistry, Statistics I & II, Medical Microbiology, Neuroscience  
**Graduate:** Fundamentals of Neuroscience I & II, Principles of Cellular and Molecular Biology, Statistics and Experimental Design for the Biomedical Sciences, Introduction to Functional Genomics, Professional Development in Biomedical Research

## REFERENCES

James Herman, Ph.D.  
Professor and Chair of Pharmacology  
& Systems Physiology  
University of Cincinnati  
231 Albert Sabin Way  
Cincinnati, OH 45267  
513-558-5636  
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