Johnathan M. Borland, Ph.D.

Curriculum Vitae
July 2023

University of Minnesota
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Minneapolis, MN 55455
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EDUCATION

Postdoctoral Research Fellowship (NIH-NIDA T32 & NIH-NICHHD S1-funded) 2019-present
School of Medicine, Neuroscience
University of Minnesota, Minneapolis, MN
Advisors: Drs. Robert L. Meisel, Paul G. Mermelstein and Patrick E. Rothwell

Doctor of Philosophy & Master of Science, Neuroscience (NIH-NIMH F31-funded) 2013-2019
Neuroscience Institute
Georgia State University, Atlanta, GA
Advisors: Drs. H. Elliott Albers and Kyle J. Frantz

Post-Bachelor's, Chemistry and Biology 2011-2012
Georgia State University, Atlanta, GA
Advisor: Dr. Matthew Grober

Bachelor's of Science, Chemistry; Bachelor's of Art, Psychology 2005-2009
Emory University, Atlanta, GA
Advisors: Drs. Dennis C. Liotta, Jose Soria and Irene Browne

RESEARCH POSITIONS

Postdoctoral Fellowship Research, School of Medicine, *Univ. of Minnesota* 2019-present
My Postdoctoral research focuses on the role of synaptic plasticity in the nucleus accumbens (NAc) on the rewarding properties of dominance status and sex behavior in female Syrian hamsters. The goal of this research is to better understand the mechanisms behind social behaviors, which should lead to more proficient treatment strategies for psychiatric disorders and improve mental health.

Graduate Fellowship Research, Neuroscience Institute, *Georgia State University* 2013-2019
My dissertation research focused on sex differences in the oxytocin and dopamine system regulation of social reward in Syrian hamsters. My dissertation work provided support for the hypothesis there is an inverted U shaped curve for social reward value dependent upon the duration and intensity of social stimulation, and that females' inverted U curve is shifted to the left, more sensitive compared to males. I was also the lead on a project investigating the role of $GABA_A$ receptors in the lateral septum on aggressive behavior in males and females, and the modulating effects of social experience on this mechanism.

Undergraduate Honors Research, Department of Chemistry, *Emory University* 2007-2009
As an undergraduate, I worked on the synthesis of a nucleoside analogue that acts as an anti-viral reverse transcriptase inhibitor for HIV.

Undergraduate Research, Department of Sociology, *Emory University* 2007-2008
As an undergraduate, I also assisted with research in a lab in the Department of Sociology. I analyzed over fifty years of census data on minority populations throughout the metropolitan Atlanta area and factors that influence racial segregation including advanced and secondary forms of marginalization.

PROFESSIONAL POSITIONS

Chemist, Analysts Inc., *Suwanee, GA* 2012-2013

I performed and trouble-shoot several physical and chemical experiments following American Society of Testing and Materials (ASTM) standards for oil, diesel fuel, refrigerants and greases. I also served as the laboratory safety coordinator.

Emergency Medical Technician-Intermediate, LifeStar EMS, *Norcross, GA* 2010-2012

I was a technician at an emergency medical transportation company that serviced the greater metropolitan Atlanta area.

PUBLICATIONS (** Denotes DEI focused)

Hall M.A.L., Kohut-Jackson A.L., Peyla A.C., Friedman, G.D., Simco, N.J., **Borland J.M.,** Meisel, R.L. (2023). Melanocortin receptor 3 and 4 expression in the adult female Syrian hamster. Frontiers in Molecular Neuroscience. Vol. 16. doi: 10.3389/fnmol.2023.1038341

Borland J.M., Dempsey D.A., Peyla A.N., Hall, M.A.L., Kohut-Jackson A.L., Mermelstein P.G., Meisel R.L. (2023). Aggression results in the phosphorylation of ERK1/2 in the nucleus accumbens and the dephosphorylation of mTOR in the medial prefrontal cortex in female Syrian hamsters. International Journal of Molecular Sciences. 24(2):1379. PMID:36674893 10.3390/ijms24021379

Hill-Jarrett T.G., Ng R., Cardenas-Iniguez C., Akinsanya J., Blanco I., **Borland J.M., Brown J.S., Clemons T., Cushnie A.K., Garcia J., George B., Hassinan C.W., Hines T.J., Landayan D., McCorkle T.A., Meckel K.R., Metcalfe M., Montoya S.A., Rose D.K., Warren D.R. (2023). A developmental approach to diversifying neuroscience through effective mentorship practices: perspectives on cross-identity mentorship and a critical call to action. Frontiers in Integrative Neuroscience. (accepted). 10.3389/fnint.2023.1052418

Taylor J.H., Walton J.C., McCann K.E., Norvelle A., Liu Q., Velden J.V., **Borland J.M.**, Hart M., Jin C., Huhman K.L., Cox D.N., Albers H.E. (2022). CRISPR-Cas9 editing of the arginine-vasopressin V1a receptor produces paradoxical changes in social behavior in Syrian hamsters. Proceedings of the National Academy of Sciences. 119(19):e212037119. PMID: 35512092 10.1073/pnas.2121037119

Borland J.M., Kim E., Swanson S.P., Rothwell P.E., Mermelstein P.G., Meisel R.L. (2020). Effect of aggressive experience in female Syrian hamsters on glutamate receptor expression in the nucleus accumbens. Frontiers in Behavioral Neuroscience**.** 14:583395. PMID: 33328919 10.3389/fnbeh.2020.583395

Borland J.M., Walton J.C., Norvelle A.N., Grantham K.N., Aiani L.M., Larkin T.E., McCann K.E., Albers H.E. (2020). Social experience and sex-dependent regulation of aggression in the lateral septum by extrasynaptic $GABA_A$ receptors. Psychopharmacology. 237(2):329-344. PMID:31691846 10.1007/s00213-019-05368-z

Borland J.M., Rilling J.K., Frantz K.J., Albers H.E. (2019b) Sex-dependent regulation of social reward by oxytocin: an inverted U hypothesis. Neuropsychopharmacology. 44(1):97-110. Review. PMID: 29968846 10.1038/s41386-018-0129-2

Borland J.M., Aiani L.M., Norvelle A.N., Grantham K.N., O'Laughlin K.N., Terranova J.I., Frantz K.J., Albers H.E. (2019a). Sex-dependent regulation of social reward by oxytocin receptors in the ventral tegmental area. Neuropsychopharmacology. 44(4):785-792. PMID: 30467338 10.1038/s41386-018-0262-y

Borland J.M., Grantham K.N., Aiani L.M., Frantz K.J., Albers H.E. (2018) Role of oxytocin in the ventral tegmental area on social reinforcement. Psychoneuroendocrinology. 95:128-137. PMID: 29852406 10.1016/j.psyneuen.2018.05.028

Borland J.M., Frantz K.J., Aiani L.M., Grantham K.N., Song Z., Albers H.E. (2017) A novel operant task to assess social reward and motivation in rodents. Journal of Neuroscience Methods. 287:80-88. PMID: 28587895 10.1016/j.jneumeth.2017.06.003

Song Z., **Borland J.M.**, Larkin T.L., O'Malley M., Albers H.E. (2016) Activation of oxytocin receptors, but not AVP V1a receptors, in the ventral tegmental area of male Syrian hamsters is essential for the reward-like properties of social interactions. Psychoneuroendocrinology. 74:164-172. PMID: 2763574 10.1016/j.psyneuen.2016.09.001

BOOK CHAPTERS

Borland J.M., Meisel RL. (2022). Modeling aggression in Syrian hamsters: the role of the nucleus accumbens. Handbook of Anger, Aggression and Violence. doi:10.1007/978-3-030-98711-4_148-1.

Kohut-Jackson A.L., **Borland J.M.,** Meisel R.L. (2023). Modeling female sexual desire: an overview and commentary. In Kabir, R. Parsa A.D. Ed. Women's Health Problems – A Global Perspective. London: IntechOpen, 2022. DOI: 10.5772/intechopen.108269

GRANT SUPPORT (** Denotes DEI focused)

****R25 NS117356,** PI: R.L. Meisel and P.G. Mermelstein 2021-present
Diversifying CNS Fellowship

****R01 HD100007-03S1,** PI: R.L. Meisel 2021-2023
Research Supplements to Promote Diversity in Health-Related Research, $165,214.

T32 DA007234-33, PI: P.G. Mermelstein 2019-2021
Neuroscience Training in Drug Abuse Research

F31 MH113367-01A1, NRSA to **Johnathan M. Borland**, Sponsor: H.E. Albers 2017-2019
Sex Differences in Oxytocin Modulation of Social Reward in the Mesolimbic Dopamine System, $76,504.

PRESENTATIONS (** Denotes DEI focused)

Invited Talk, *University of Texas at Dallas* 2023
A 30-min presentation highlighting my dissertation and postdoctoral research on "Advances in understanding the rewarding properties of social interactions".

Invited Talk, *Louisiana State University* 2023
A 60-min presentation highlighting my dissertation and postdoctoral research on "Advances in understanding the rewarding properties of social interactions".

Invited Talk, *Temple University* 2022
A 60-min presentation highlighting my dissertation and postdoctoral research on "Advances in understanding the rewarding properties of social interactions".

Society for Social Neuroscience Conference, *virtual* 2021
A 30-min presentation that was part of a symposium with Drs. Brian Trainor, Natalie Ebner and Benjamin Tabak highlighting "oxytocin modulation of social and affective processes across species: insights for therapeutic potential and sex-dependent specificity".

Society for Behavioral Neuroendocrinology: WC Young Award Talk. *virtual* 2021
A 30-min presentation highlighting my dissertation work supporting the "sex-dependent regulation of social reward by oxytocin".

Medical Discovery Team on Addiction Seminar Series, *University of Minnesota* 2020
A 30-min presentation introducing myself to the neuroscience community at the University of Minnesota and recent research on "the effects of aggressive experience on synaptic plasticity and glutamate receptor subunit expression in the nucleus accumbens in female Syrian hamsters".

Thinking Nobel: Karolinska Institute Neuroscience & Music Lab, *Stockholm, Sweden* 2019

A 15-min overview of my dissertation research investigating sex differences in the rewarding properties of social interaction and how the oxytocin system modulates social reward. I presented at the Karolinska Institute in Stockholm as part of a study abroad.

****Morehouse School of Medicine Lecture Series,** *Morehouse Neuroscience Institute* 2019

A 60-min presentation of my research revealing sex differences in the rewarding properties of social interactions in Syrian hamsters and how the oxytocin system can have sex-specific effects on social reward. I also discussed the proposed model of a sex-dependent inverted U shaped curve for social reward value.

Brains & Behavior Retreat Lecture Series, *Center for Behavioral Neuroscience* 2018

A 30-min presentation of sex differences in social reward and oxytocin's potential sex dependent effects on social reward.

Animal Behavior Conference, *Indiana University* 2018

A 15-min summary of recent finding in the lab showing that same-sex social interactions are more rewarding for female Syrian hamsters compared to males. Furthermore, how oxytocin may modulate this sex difference in social reward.

Neuroscience Institute Breakfast Lecture Series, *Georgia State University* 2017

A 60-minute lecture introducing "a novel operant behavioral task that investigates social motivation and social reward in Syrian hamsters".

Neuroscience Institute Breakfast Lecture Series, *Georgia State University* 2016

A 30-minute lecture on "sex differences in social reward" including presentation of an experiment showing OT administration in the VTA decreases conditioned social preference in females, but increases it in male hamsters.

PROFESSIONAL HONORS (** Denotes DEI focused)

Intersections Science Fellow Symposium Awardee Yale University 2023
Organization for the Study of Biological Sex Differences Poster Presentation Award 2023
MnDRIVE Neuromodulation Postodoctoral Fellowship Awardee (declined) 2023
University of Minnesota Presidential Postdoctoral Fellowship Program Awardee 2023
Life Science Research Foundation Finalist 2023
Supporting Outstanding Academic Research Honorable Mention Award, UT at Dallas 2022
Travel Award, Japan Neuroscience Society 2022
****Research Supplements to Promote Diversity in Health-Related Research,** NIHCHHD 2021
****Diversifying CNS Fellowship,** National Institute of Neurological Disorders and Stroke 2021
WC Young Recent Graduate Award, Society for Behavioral Neuroendocrinology 2021
T32 Training Fellowship, Department of Neuroscience, Minneapolis, MN 2019
Outstanding Doctoral Student Award, Neuroscience Institute, Atlanta, GA 2019
International Access Scholarship, GSU-Karolinska Institute, Atlanta GA 2019
Honeycutt Fellowship, Neuroscience Institute, Atlanta GA 2018
NRSA F31 Predoctoral Fellowship, National Institute of Mental Health 2017
Brains & Behavior Fellowship, Neuroscience Institute, Atlanta GA 2015
Field Training Officer, LifeStar EMS, Norcross GA 2010
Certified Emergency Medical Technician-Intermediate, Emory University, Atlanta GA 2008
Certified American Red Cross Lifeguard, Emory University, Atlanta GA 2008
Eagle Scout, Boy Scouts of America, Hamilton MA 2003

AD HOC REVIEWER

Neuropsychopharmacology
Biomedicine & Pharmacotherapy
Frontiers in Psychiatry

MEMBERSHIPS and COMMITTEES (** Denotes DEI focused)

Japan Neuroscience Society	2022-present
**Black in Neuro	2021-present
**Graduate Program in Neuroscience Diversity, Equity, and Inclusion Committee	2020-present
International Behavioral Neuroscience Society	2020-present
Organization for the Study of Biological Sex Differences	2018-present
Society for Behavioral Neuroendocrinology	2016-present
Society for Social Neuroscience	2015-present
Society for Neuroscience	2015-present
American Physiology Society	2015-2016
American Chemical Society	2008

POSTER PRESENTATION

Borland J.M., Kohut-Jackson A.L., Peyla A.N., Hall M.A.L., Mermelstein P.G., Meisel R.L. Efficacy of Bremelanotide (Vyleesi) and melanocortin 4 receptors in the nucleus accumbens to enhance sexual motivation in female Syrian hamsters. **Organization for the Study of Sex Differences,** Calgary, AB 2023.

Borland J.M., Kohut-Jackson A.L., Peyla A.N., Hall M.A.L., Mermelstein P.G., Meisel R.L. Efficacy of Bremelanotide (Vyleesi) and melanocortin 4 receptors in the nucleus accumbens to enhance sexual motivation in female Syrian hamsters. **Society for Neuroscience,** San Diego, CA 2022.

Borland J.M., Kohut-Jackson A.L., Peyla A.N., Hall M.A.L., Mermelstein P.G., Meisel R.L. Efficacy of Bremelanotide (Vyleesi) and melanocortin 4 receptors in the nucleus accumbens to enhance sexual motivation in female Syrian hamsters. **University of Iowa Synapse Workshop,** Iowa City, IA 2022.

Hall M.A.L., Kohut-Jackson A.L., **Borland J.M.,** Peyla A.C., Meisel, R.L. Melanocortin receptor 3 and 4 expression in the adult Syrian hamster. **Minnesota Symposium on Addiction Neuroscience,** Minneapolis, MN 2022.

Borland J.M., Kohut-Jackson A.L., Peyla A.N., Hall M.A.L., Mermelstein P.G., Meisel R.L. Efficacy of Bremelanotide (Vyleesi) and melanocortin 4 receptors in the nucleus accumbens to enhance sexual motivation in female Syrian hamsters. **NEURO2022,** Okinawa, Japan 2022.

Borland J.M., Kohut-Jackson A.L., Peyla A.N., Hall M.A.L., Mermelstein P.G., Meisel R.L. Efficacy of Bremelanotide (Vyleesi) and melanocortin 4 receptors in the nucleus accumbens to enhance sexual motivation in female Syrian hamsters. **Society of Behavioral Neuroendocrinology,** Atlanta, GA 2022.

Dempsey D.A., **Borland J.M.**, Meisel R.L. FMRP signaling underlying aggression in female hamsters. **Life Science Summer Undergraduate Research Program,** Minneapolis, MN 2021.

Borland J.M., Kim E., Swanson S.P., Rothwell P.E., Mermelstein P.G., Meisel R.L. Aggressive behavior in female Syrian hamsters results in an increase in both AMPA and metabotropic glutamate receptor expression in the nucleus accumbens. **International Behavioral Neuroscience Society,** virtual, 2020.

Borland J.M., O'Laughlin K., Grantham K.N., Aiani L.M., Frantz K.J., Albers H.E. Sex differences in social reward and sex-specific effects of oxytocin on social reward and social motivation in Syrian hamsters. **Society for Neuroscience,** San Diego, CA 2018.

Borland J.M., O'Laughlin K., Grantham K.N., Aiani L.M., Frantz K.J., Albers H.E. Sex differences in social reward and sex-specific effects of oxytocin on social reward and social motivation in Syrian hamsters. **Society for Social Neuroscience,** San Diego, CA 2018

Borland J.M., Grantham K.N., Aiani L.M., O'Laughlin K., Frantz K.J., Albers H.E. Sex differences in oxytocin modulation of social reward and social motivation in Syrian hamsters. **Society for Behavioral Neuroendocrinology,** Toronto, ON 2018.

Borland J.M., O'Laughlin K., Aiani L.M., Grantham K.N., Frantz K.J., Albers H.E. Sex differences in oxytocin modulation of the rewarding properties of social interactions. **Organization for the Study of Sex Differences,** Atlanta, GA 2018.

Borland J.M., Aiani L.M., Grantham K.N., Johnson A.R., Frantz K.J., Albers H.E. Sex differences in oxytocin modulation of the rewarding properties of social interactions. **Society for Neuroscience,** Washington D.C. 2017.

Borland J.M., Aiani L.M., Grantham K.N., Johnson A.R., Frantz K.J., Albers H.E. Sex differences in oxytocin modulation of the rewarding properties of social interactions. **Society for Social Neuroscience,** Washington D.C. 2017.

Borland J.M., Grantham K., Aiani L., Norvelle A., Song E., Frantz K.J., Albers H.E. A novel behavioral test for social motivation in Syrian hamsters. **Society for Neuroscience.** San Diego, CA 2016.

Borland J.M., Aiani L., Grantham K., Song E., Albers H.E. Oxytocin (OT) in the ventral tegmental area (VTA) has sex specific effect on social reward in Syrian hamsters. **Society for Social Neuroscience.** San Diego, CA 2016

Borland J.M., Aiani L., Grantham K., Song E., Albers H.E. Oxytocin (OT) in the ventral tegmental area (VTA) has sex specific effect on social reward in Syrian hamsters. **Atlanta Chapter Society for Neuroscience Posterpalooza.** Atlanta, GA 2016

Borland J.M., Aiani L., Grantham K., Song E., Albers H.E. Oxytocin (OT) in the ventral tegmental area (VTA) has sex specific effect on social reward in Syrian hamsters. **Society for Behavioral Neuroendocrinology.** Montreal, QC 2016

Borland J.M., Larkin T.L., Norvelle A., Albers H.E. Social experience modulates the ability of extrasynaptic $GABA_A$ receptor activation to induce aggression in males, but not females. **Brains & Behavior Retreat.** Atlanta, GA 2016

Borland J.M., Larkin T.L., Norvelle A., Albers H.E. Social experience modulates the ability of $GABA_A$ receptor activation to induce aggression in males, but not females. **Society for Neuroscience.** Chicago, IL 2015

Borland J.M., Larkin T.L., Norvelle A., Albers H.E. Social experience modulates the ability of $GABA_A$ receptor activation to induce aggression in males, but not females. **Society for Social Neuroscience.** Chicago, IL 2015

Borland J.M., Larkin T.L., Norvelle A., Albers H.E. Social experience modulates the ability of $GABA_A$ receptor activation to induce aggression in males, but not females. **Atlanta Chapter Society for Neuroscience.** Atlanta, GA 2015

Borland J.M., Land E.M., Liotta D.C. and Soria J.J. Studies towards the stereoselective construction of novel nucleoside analogs. **American Chemical Society**, Philadelphia, PA 2008

TEACHING & TUTORING (** Denotes DEI focused)

Biol 2996 Mentor, *University of Minnesota* 2023-present

I mentored three undergraduate students for four-week rotations in the lab to gain laboratory experience. Mentorship and experience included research paper analyses, neuroanatomy, and fundamental laboratory procedures such as cryostat slicing, fluorescent microscope use and image collection, and rodent behavior testing. Intructor: Dr. Lorene Lanier

Guest Lecturer, NSCI 1001: Fundamental Neuroscience, *University of Minnesota* 2020-present

Two 50-min lectures to undergraduate students about learning & memory and neurogenesis. The first lecture covers how the hippocampus is responsible for the conversion of short-term memory into long-term memory and the synaptic mechanisms

mediating habituation and sensitization. The second lecture discusses the discovery of neurogenesis in the brain and factors such as the environment that regulate neurogenesis. Instructors: Drs. Meisel and Mermelstein.

****LSSURP Seminar Coordinator,** *University of Minnesota* 2021-present
I am seminar coordinator for six to seven undergraduate students from underrepresented backgrounds in science during a 10-week intensive summer research program focused on various disciplines of neuroscience. Topics covered include the scientific method, including background research, hypothesis testing, introduction, methodology, results, discussion and research presentation.

****Go4Brains Presenter,** *University of Minnesota* 2021-2022
A 90-min interactive presentation to high school students from underrepresented backgrounds in science on brain plasticity. Instructor: Dr. Janet Dubinsky.

****LSSURP Mentor,** *University of Minnesota* 2021
I mentored a post-bachelor's student during a 10-week intensive summer research program. The project investigated the role of second messenger signaling molecules on the rewarding properties of dominance status in female Syrian hamsters.

****Teching Assistant, NEUR 4000: Neuroscience Laboratory,** *Georgia State Univer.* 2014-2016
I instructed students in advanced neuroscience techniques. I also lead students in the development and execution of independent research projects that culminated in a poster session in which students present their projects to fellow neuroscience undergraduate, graduate and faculty members. Instructor: Dr. Manfred Schmidt.

Tutor, Club Z Tutoring & StudyPoint Tutoring, *Atlanta, GA* 2010-2012
I tutored high school students throughout the greater metropolitan Atlanta area, specializing in advanced high school mathematics and chemistry. I was also self-employed through networking contacts; tutoring college level organic chemistry. Supervisor: Kai Sung.

Supplementary Instructions Leader & Epass Tutor, Dep. of Chemistry, *Emory Univ.* 2008-2009
I led weekly study sessions for Organic Chemistry I and II courses and I was a one-on-one Organic Chemistry tutor. Instructors: Drs. Tracy Morkin, Albert Padwa, Soria and Liotta.

LABORATORY MENTORING EXPERIENCE

Peyton Reeder, Undergraduate
Megan A.L. Hall, Technician
Desarae A. Dempsey, Post-bachelor's summer student
Abigail L. Kohut-Jackson, Master's student
Anna C. Peyla, Technician
Sam P. Swanson, Technician
Ellen Kim, Technician
Erica A. Cross, Graduate student
Dene A. Voisin, Graduate student
Oluwatobiloba R Quadri, Undergraduate
Corey Andrews, Undergraduate
Kylie O'Laughlin, Undergraduate
Kymberly N. Grantham, Undergraduate
Lauren M. Aiani, Undergraduate