

*Curriculum Vitae*  
**Joshua David Gross**

130 Research Dr., Room 481, CARL Building  
Durham, NC 27710  
Duke University School of Medicine  
Department of Cell Biology  
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**EDUCATION**

Undergraduate

2010-2014

**James Madison University**, Harrisonburg VA  
*Major*: Psychology, B.S., *with distinction, Magna Cum Laude*  
Advisor (Honors Thesis): Michael Hall, Ph.D.  
*Minor*: Biology

Doctoral

2014-2019

**West Virginia University**, Morgantown WV  
*Program*: Biomedical Sciences (Cellular & Integrative Physiology)  
Advisor (Ph.D. Thesis): David Siderovski, Ph.D. & Vincent Setola, Ph.D.

Postdoctoral

2019-2023

**Duke University**, Durham NC  
*Research Focus*: Molecular Neuropharmacology & GPCR Signaling  
Advisor: Marc Caron, Ph.D.

Faculty

Aug. 2023-

**Penn State University**, State College PA  
*Appointment(s)*: Depts. of Nutritional Sciences (primary, co-hire with Huck Life Sciences Institute), Biobehavioral Health (secondary), and Pharmacology (courtesy; College of Medicine, Hershey PA)

**POSITIONS & HONORS**

Research Positions & Fellowships

2012 – 2014

*Undergraduate Research Assistant*, Psychoacoustics Laboratory; James Madison University, Harrisonburg VA

2013

*Summer Undergraduate Research Intern (SURI)*, West Virginia University School of Medicine, Morgantown WV

2013 – 2014

*Undergraduate Research Assistant*, Behavioral Pharmacology Laboratory; James Madison University, Harrisonburg VA

2014 – 2019

*Doctoral Candidate*, Cellular and Integrative Physiology Graduate Program, West Virginia University School of Medicine, Morgantown, WV. *Regulator of G Protein Signaling-12 (RGS12) in Dopaminergic and Kappa Opioid Receptor-Dependent Signaling and Behavior.*

2019 – present *Postdoctoral Scholar*, Department of Cell Biology, Duke University School of Medicine, Durham NC. *Biased Signaling at the Ghrelin Receptor*.  
2021 – 2022 *Duke University Preparing Future Faculty Program (PFF)*. Postdoctoral Fellow.

### Honors

2011 – 2014 *Honors Program Scholar*, James Madison University, Harrisonburg VA.  
2011 – 2014 *National Society of Collegiate Scholars*; James Madison University, Harrisonburg VA  
2011 – 2014 *Sigma Alpha Lambda: National Leadership and Honors Organization*; James Madison University, Harrisonburg VA  
2013 *Dean's Award for Outstanding Research Poster* at the Undergraduate Psychology Research Symposium; James Madison University, Harrisonburg VA  
2013 *Department of Psychology Grant for Outstanding Undergraduate Scholarship* to present a research poster at the Society for Neuroscience (SfN) Conference; San Diego CA 2014  
2014 *Dean's Award for Outstanding Honors Thesis* at the Undergraduate Psychology Research Symposium; James Madison University, Harrisonburg VA  
2015 *Award for Outstanding Predoctoral Student Poster Presentation*, 2<sup>nd</sup> place, West Virginia University Neuroscience Retreat (2015)  
2016 *Award for Outstanding Predoctoral Student Poster Presentation*, 1<sup>st</sup> place, West Virginia University Neuroscience Retreat (2016)  
2017 *Award for Outstanding Predoctoral Student Poster Presentation*, 3<sup>rd</sup> place, West Virginia University Neuroscience Retreat (2016)  
2017 *Cellular & Integrative Physiology 'Rising Star Award' for Outstanding Ph.D. Student*, West Virginia University, Morgantown WV  
2018 *Cellular & Integrative Physiology 'Rising Star Award' for Outstanding Ph.D. Student*, West Virginia University, Morgantown WV  
2021 *Accepted as a member* of American Society for Pharmacology and Experimental Therapeutics (ASPET)  
2023 *Invited Speaker/Visit* to WVU Dept. of Physiology & Pharmacology Seminar Series (Morgantown, WV)  
2023 *Travel Award* for ASPET Meeting 2023 (St. Louis, MO)  
2023 *Award for Outstanding Postdoctoral Student Poster Presentation*, 2<sup>nd</sup> place, ASPET Meeting (St. Louis, MO)

### **PEER-REVIEWED PUBLICATIONS**

- 1) Gall BJ, Wilson A, Schroer AB, **Gross JD**, Stoilov P, Setola V, Watkins C, Siderovski DP. "Genetic variations in GPSM3 associated with protection from rheumatoid arthritis directly affect its transcript abundance". *Genes & Immunity*. 2016 Mar;17(2):139-47. PMID: PMC4777669.
- 2) Gall BJ, Schroer AB, **Gross JD**, Setola V, Siderovski DP. "Reduction of GPSM3 expression akin to the arthritis protective SNP rs204989 differentially affects

migration in a neutrophil model." *Genes & Immunity*. 2016 Sep;17(6):321-7. PMID: PMC5009006.

- 3) **Gross JD**, Kaski SW, Schroer AB, Wix K, Siderovski DP, Setola V. "RGS12 modulates the dopamine transporter in ventral striatum and locomotor responses to psychostimulants". *Journal of Psychopharmacology*. 2018 Feb; 32(2):191-203. PMID: 29364035.
- 4) Schroer AB, **Gross JD**, Kaski SW, Wix K, Siderovski DP, Vandenbeuch A, & Setola V. "Development of full sweet, umami, and bitter taste responsiveness requires Regulator of G protein Signaling-21 (RGS21)." *Chemical Senses*. April 26, 2018. PMID: 29701767
- 5) Trexler KR, Nass SR, Crowe MS, **Gross JD**, Jones MS, McKittrick AW, Siderovski DP, & Kinsey SG. "Novel behavioral assays of spontaneous and precipitated THC withdrawal in mice." *Drug & Alcohol Dependence*. 2018 Oct 1;191:14-24. PMID: 30071445.
- 6) **Gross JD**, Kaski SW, Schroer AB, Wix K, Setola V, Siderovski DP. "The role of RGS12 in the differential regulation of kappa opioid receptor-dependent signaling and behavior". *Neuropsychopharmacology*. 2019 Sep;44(10):1728-1741. PMID: 31141817.
- 7) Kaski SW, White AN, **Gross JD**, Trexler KR, Wix K, Harland AA, Prisinzano TE, Aubé J, Kinsey SG, Kenakin T, Siderovski DP, Setola V. "Preclinical Testing of Nalfurafine as an Opioid-sparing Adjuvant that Potentiates Analgesia by the Mu Opioid Receptor-targeting Agonist Morphine". *Journal of Pharmacology & Experimental Therapeutics*. 2019 Nov;371(2):487-499. PMID: 31492823.
- 8) White AN, **Gross JD**, Kaski SW, Trexler KR, Wix KA, Wetsel WC, Kinsey SG, Siderovski DP, Setola V. "Genetic deletion of Rgs12 in mice affects serotonin transporter expression and function in vivo and ex vivo". *Journal of Psychopharmacology*. 2020 Dec;34(12):1393-1407. PMID: 32842837.
- 9) Kaski SW, White AN, **Gross JD**, Siderovski DP. "Potential for Kappa-Opioid Receptor Agonists to Engineer Nonaddictive Analgesics: A Narrative Review". *Anesthesia & Analgesia. Review*. 2021 Feb 1;132(2):406-419. PMID: 33332902.
- 10) **Gross JD**, Kim DW, Zhou Y, Jansen D, Slosky LM, Clark N, Ray CR, Hu X, Southall N, Wang A, Xu X, Barnaeva E, Ferrer M, Marugan JJ, Caron MG, Barak LS, Toth K. "Discovery of a functionally selective ghrelin receptor (GHSR<sub>1a</sub>) ligand for modulating brain dopamine." *Proceedings of the National Academy of Sciences (PNAS)*. 2022 Mar 8;119(10):e2112397119. doi: 10.1073/pnas.2112397119. PMID: 35239443.
- 11) Slosky LM, Pires A, Bai Y, Clark NB, Hauser ER, **Gross JD**, Porkka F, Zhou Y, Chen X, Pogorelov VM, Toth K, Wetsel WC, Barak LS, Caron MG. "Establishment of multi-stage intravenous self-administration paradigms in mice". *Scientific Reports (Sci. Rep)*. 2022 Dec 11;12(1):21422. doi: 10.1038/s41598-022-24740-2.
- 12) **Gross JD**, Zhou Y, Barak LS, Caron MG. "Ghrelin receptor signaling in health and disease: a biased view". *Cell Trends in Endocrinology and Metabolism. Review*. 2022 Dec 24;S1043-2760(22)00216-8. PMID: 36567228.

## ABSTRACTS & PRESENTATIONS

### Undergraduate

- 1) Clasen M, Sequeira S, **Gross JD**, O'Malley J.J., Shemery A, Holt D, & Dyche J. *The Effect of Cocaine on Delay Discounting in the SHR*. Society for Neuroscience (SfN) Conference, San Diego, CA (Nov 2013)

- 2) **Gross JD**, Ponder K, & Hall M. Fundamental Frequency as a Function of Deception and Stress. *Honors Psychology Research Symposium*, James Madison University, Harrisonburg, VA (April 2014).

#### Graduate

- 1) **Gross JD**, Setola V, Wix K, Siderovski D. *Mouse Brain Expression and Function of Regulator of G Protein Signaling-12 (RGS12) in Sensorimotor Gating and Locomotive Behaviors*. West Virginia University Neuroscience Retreat, Wheeling, WV (July 2015). Poster presentation.
- 2) **Gross JD**, Setola V, Wix K, Siderovski D. *Mouse Brain Expression and Function of Regulator of G Protein Signaling-12 (RGS12) in Sensorimotor Gating and Locomotive Behaviors*. Society for Neuroscience, Chicago, IL (Oct 2015). Poster presentation.
- 3) **Gross JD**, Schroer A, Gall B, Setola V, Siderovski D. *The Role of Regulator of G Protein Signaling-12 (RGS12) in Schizophrenia-related Behaviors and Pathophysiology*. Van Liere Research Day, Morgantown, WV (March 2016). Poster presentation.
- 4) **Gross JD**, Schroer A, Wix K, Kaski S, Siderovski DP, Setola V. *Regulator of G Protein Signaling-12 (RGS12) modulates the action of amphetamine and amphetamine-related psychostimulants*. West Virginia University Neuroscience Retreat, Wheeling, WV (July 2016). Poster presentation.
- 5) **Gross JD**, Schroer A, Wix K, Siderovski DP, Setola V. *Regulator of G Protein Signaling-12 (RGS12) in the action of amphetamine and related drugs of abuse*. Society for Neuroscience, San Diego, CA (Nov 2016). Poster presentation.
- 6) **Gross JD**, Kaski S, Schroer A, Wix K, Siderovski DP, & Setola V. *Regulator of G Protein Signaling-12 (RGS12) modulates ventral striatal dopamine function and behavioral responses to psychostimulant drugs-of-abuse*. Oral presentation. West Virginia University Van Liere Conference Day, Morgantown, WV (March 2017). Poster presentation.
- 7) **Gross JD**, Kaski SW, Schroer AB, Wix K, Siderovski DP, Setola V. *RGS12 modulates the dopamine transporter in ventral striatum and locomotor responses to psychostimulant drugs-of-abuse*. Society for Neuroscience, Washington D.C., (Nov 2017). Poster presentation.
- 8) **Gross JD**, Kaski SW, Schroer AB, Siderovski DP, Setola V. *RGS12 modulates dopamine transporter function in ventral striatum via a kappa-opioid receptor-dependent mechanism*. Gordon Research Conference: Membrane Transport Proteins, Newry, ME, (June 2018). Poster presentation.
- 9) **Gross JD**. *Regulator of G Protein Signaling-12 (RGS12) modulates the dopamine transporter in ventral striatum via differential regulation of kappa opioid receptor signaling*. FAU Brain Institute, Jupiter, FL (Sept. 2018). **Oral presentation**.

#### Postdoctoral

- 1) **Gross JD**. *A Novel, Functionally Selective Ligand for the Ghrelin Receptor*. PharmD-2021: International Conference on Pharmaceutical Research and Drug Development. Virtual. September 2021. **Oral presentation**.
- 2) **Gross JD**. *Discovery and characterization of a functionally selective ghrelin receptor ligand for modulating brain dopamine homeostasis*. Dopamine-2022 (International Conference). In-Person. May 2022. **Oral presentation (invited)**.
- 3) **Gross JD**. *Ghrelin Receptor (GHSR<sub>1a</sub>) Functional Selectivity As A Novel Pharmacotherapeutic Strategy To Normalize Dysfunctional Metabolic Homeostasis*. ENDO-2022 (International Conference). In-Person. June 2022. **Oral presentation**.

- 4) **Gross JD.** *Functional Selectivity at the Ghrelin Receptor: A Novel Pharmacotherapeutic Strategy to Modulate Brain Dopamine Homeostasis.* FASEB: Arrestins and GRKs (International Conference). In-Person. August 2022. **Oral presentation (invited).**
- 5) **Gross JD.** *Pharmacological and Genetic Tools to Investigate Ghrelin Receptor (GHSR) Signaling Bias in Reward Behavior and Metabolism.* WVU Dept. of Physiology & Pharmacology Seminar Series (Morgantown, WV). **Invited Speaker/Visit.**
- 6) **Gross JD.** *Pharmacological and Genetic Preclinical Models of Ghrelin Receptor Functional Selectivity to Investigate Metabolic Disease Pathophysiology.* ASPET Meeting. In-Person. May 2023. **Poster and oral presentation (Travel Award).**

## PATENTS

02/2022 (filed)      **DU7295PCT / POL No. 21-2032-WO: Composition of Matter.**  
 "Compositions for the Treatment of Food and Chemical Addiction and Methods of Making and Using NCATS-SM8864, a.k.a. N8279, and its Derivatives". *Inventor.*

## RESEARCH SUPPORT & FELLOWSHIPS

07/2015 - 07/2017      **T32 Training Grant:** NIGMS grant T32 GM08174 (PI)  
*Behavioral & Biomedical Sciences (BBS).*

08/2017 - 08/2020      **F31 Fellowship:** NIDA grant F31 DA043331 (PI)  
*"The role of RGS12 in the action of amphetamine and related drugs of abuse."*

07/2020 - 07/2023      **F32 Fellowship:** NIDA grant F32 DA051139 (PI)  
*"Exploiting Biased Agonism at the Ghrelin Receptor (GHSR1a) for Opioid Addiction."*

07/2021 - 07/2022      **Duke University Preparing Future Faculty (PFF) Fellowship.**  
*Advisor: Dr. Yuko Miyamoto (Elon University).*

## TEACHING & STUDENT MENTORING EXPERIENCE

07/2018                      *Guest Lecturer* for Neuroscience, Brain Function, and Behavior:  
 "Anxiolytics". Psychiatry Residency Training Program (PGY2). West Virginia University, Morgantown, WV.

11/2018                      *Guest Lecturer* for Cellular Methods: "Introduction to Behavior in Biomedical Sciences." 1<sup>st</sup> year Biomedical Sciences Ph.D. students. West Virginia University, Morgantown WV.

07/2019                      *Guest Instructor* for Neuroscience Brain Camp: "Drug Addiction."  
 West Virginia High School students. Morgantown, WV.

02-04/2021                  *Course Instructor* for Bioethics: "The Responsible Scientist (BIOTRAIN754)". Biomedical Sciences Ph.D. Students. Duke University, Durham NC.

03/2021                      *Guest Lecturer* for PHRD641: "Cholinergic Pathways & Alzheimer's Disease." Pharmacy Graduate Students. Campbell University, Buies Creek NC.

- 06-08/2021 *Undergraduate Student Research Supervisor* for Summer Research Experience: Amber Fu (Duke Sophomore, amber.fu@duke.edu). Trained student & supervised laboratory research.
- 08/2021 *Guest Lecturer* for PHRD511: "Membrane Transport: Exo- & Endocytosis". Pharmacy Graduate Students. Campbell University, Buies Creek NC.
- 11/2021 *Guest Lecturer* for BIO4110A: "G Protein-Coupled Receptor Signaling & Therapeutic Promise". Junior & Senior Biology Majors. Elon University, Elon NC.
- 01/2022 - current *Undergraduate Student Supervisor* for Independent Study: Lara Kohlenbach (lara.kohlenbach@duke.edu@duke.edu). Trained, supervised, and evaluated research for course credit.
- 03/2022 *Guest Lecturer (remote)* for PHRD641: "Voltage-gated ion channels, GABA, & Glutamate". Pharmacy Graduate Students. Campbell University, Buies Creek NC.
- 04/2022 *Guest Lecturer* for PHRD641: "Cholinergic Pathways & Alzheimer's Disease." Pharmacy Graduate Students. Campbell University, Buies Creek NC.
- 05-08/2021 *Undergraduate Student Research Supervisor* for Summer Non-Duke Laboratory Intern. Autumn Wetsel (Rollins College Sophomore, autumn.wetsel@duke.edu). Trained student intern & supervised laboratory research.

### **PROFESSIONAL EXPERIENCE, TRAINING, & CERTIFICATIONS**

- 02/2021 Training in Neurotherapeutics Discovery & Development for Academic Scientists (competitive), 1R25NS077582-01
- 03/2021 Introduction to Molecular Modeling in Drug Discovery: Schrödinger Online Course (Certified).

### **MEMBERSHIPS**

- 2021 – present American Society for Pharmacology and Experimental Therapeutics (ASPET)