

## **Jennifer M. Wenzel, Ph.D.**

University of Maryland School of Medicine  
Department of Anatomy & Neurobiology  
20 Penn Street; HSFII, Room S251  
Baltimore, Maryland 21231  
Lab: 410-706-2440; Cell: 602-3154650  
jmwenzel@som.umaryland.edu

### **CURRENT POSITION**

Postdoctoral Scholar (2013-Present)  
University of Maryland School of Medicine  
Department of Anatomy & Neurobiology  
Mentor: Joseph F. Cheer, Ph.D.

### **PREVIOUS POSITION**

Adjunct Professor (2015-2017)  
Towson University  
Department of Biology

### **EDUCATION**

Ph.D. in Psychology, Neuroscience & Behavior (2007-2013)  
University of California Santa Barbara  
Department of Psychological & Brain Sciences  
Mentor: Aaron Ettenberg, Ph.D.  
Dissertation: An investigation of the neural substrates underlying the anxiogenic effects of cocaine.

B.S. in Psychology, *magna cum laude* (2002-2005)  
Arizona State University  
Department of Psychology  
Mentor: Janet L. Neisewander, Ph.D.  
Thesis: The effects of 7-OH-DPAT infused into the central nucleus of the amygdala on cocaine self-administration and cocaine-seeking behavior in rats.

### **GRANT SUPPORT AND FELLOWSHIPS**

F32 Postdoctoral National Research Service Award (2016-2018)  
National Institute on Drug Abuse

T32 Training Grant in Cellular and Integrative Neuroscience (2014-2015)  
National Institute of Neurological Disorders and Stroke

Dissertation Fellowship (2012)  
University of California Santa Barbara Graduate Division

Undergraduate Research Fellowship (2005)  
Arizona State University School of Life Sciences

## RESEARCH INTERESTS

### The neurobiology of motivated behaviors

- What brain systems mediate approach and avoidance?
- How do prior experiences (e.g. adolescent drug exposure, social isolation) shape reinforcement learning and underlying neural circuitry?
- How are traits linked to motivation, like impulsivity, represented in the brain?

## PUBLICATIONS

<https://scholar.google.com/citations?user=TepFHoUAAAAJ&hl=en>

15. **Wenzel JM**, Oleson EB, Gove WN, Cole AB, Gyawali U, Dantrassy HM, Bluett RJ, Dryanovski DI, Stuber GD, Deisseroth K, et al. (2018). Phasic Dopamine Signals in the Nucleus Accumbens that Cause Active Avoidance Require Endocannabinoid Mobilization in the Midbrain. *Current Biology*, 28(9):1392-1404.
14. **Wenzel JM**, Cheer JF (2018). Endocannabinoid regulation of reward and reinforcement through interaction with dopamine and endogenous opioid signaling. *Neuropsychopharmacology*, 43(1): 103-115.
13. **Wenzel JM**, Rauscher NA, Cheer JF, Oleson EB (2015). A role for phasic dopamine release within the nucleus accumbens in encoding aversion: A review of the neurochemical literature. *ACS Chemical Neuroscience*, 6(1): 16-26.
12. Ettenberg A, Cotten SW, Brito MA, Klein AK, Ohana TA, Margolin B, Wei A, **Wenzel JM** (2015). CRF antagonism within the ventral tegmental area but not the extended amygdala attenuates the anxiogenic effects of cocaine in rats. *Pharmacology, Biochemistry and Behavior*, 138:148-55.
11. Ettenberg A, Fomenko V, Kaganovsky K, Shelton K, **Wenzel JM** (2015). On the positive and negative responses to cocaine and their relation to drug self-administration in rats. *Psychopharmacology*, 232(13): 2363-75.
10. Covey DP, **Wenzel JM**, Cheer JF (2014). Cannabinoid modulation of drug reward and the implications of marijuana legalization. *Brain Research*, 1628(0): 233–243.
9. **Wenzel JM**, Cheer JF (2014). Endocannabinoid-dependent modulation of phasic dopamine signaling encodes external and internal reward-predictive cues. *Frontiers in Psychiatry*, 1(5): 118.
8. **Wenzel JM**, Cotton, SC, Dominguez HM, Lane JE, Shelton, K, Su Z-I, Ettenberg A (2013). Noradrenergic  $\beta$ -receptor antagonism within the central nucleus of the amygdala or bed nucleus of the stria terminalis attenuates the negative/anxiogenic effects of cocaine. *Journal of Neuroscience*, 34(10): 3467-74.
7. **Wenzel JM**, Su Z-I, Shelton K, Dominguez HM, von Furstenberg VA, Ettenberg A (2013). The dopamine antagonist cis-flupenthixol blocks the expression of the conditioned positive but not the negative effects of cocaine in rats. *Pharmacology, Biochemistry and Behavior*, 114-115; 90-96.
6. Su Z-I, Santoostaroam A, **Wenzel JM**, Ettenberg A (2013). On the persistence of cocaine-induced place preference and aversion in rats. *Psychopharmacology*, 229(1): 115-23.
5. Su Z-I, **Wenzel JM**, Ettenberg A, Ben-Shahar O (2013). Prior extended daily access to cocaine elevates the reward threshold in a conditioned place preference test. *Addiction Biology*, 19(5): 826-31.
4. Su Z-I, Kichaev G, **Wenzel JM**, Ben-Shahar O, Ettenberg A (2012). Weakening of negative relative to positive associations with cocaine-paired cues contributes to cue-induced responding after drug removal. *Pharmacology, Biochemistry and Behavior*, 100: 458–63.

3. **Wenzel JM**, Waldroup SA, Haber ZM, Su Z-I, Ben-Shahar O, Ettenberg A (2011). Effects of lidocaine-induced inactivation of the bed nucleus of the stria terminalis, the central or the basolateral nucleus of the amygdala on the opponent-process actions of self-administered cocaine in rats. *Psychopharmacology*, 217(2):221-30.
2. Su Z-I, **Wenzel JM**, Baird R, Ettenberg A (2011). Comparison of self-administration behavior and responsiveness to drug-paired cues in rats running an alley for intravenous heroin and cocaine. *Psychopharmacology*, 214(3):769-78.
1. Thiel KJ, **Wenzel JM**, Pentkowski NS, Hobbs RJ, Alleweireldt AT, Neisewander JL (2010). Stimulation of dopamine D2/D3 but not D1 receptors in the central amygdala decreases cocaine-seeking behavior. *Behavioural Brain Research*, 214(2): 386-94.

## MANUSCRIPTS IN PREPARATION

**Wenzel JM\***, Zlebnik NE\*, Patton MH, Ayvazian V, Smethells JR, Mathur BN, Cheer JF. Corticostriatal control of choice impulsivity.

**Wenzel JM**, Cheer JF. Adolescent, but not adult, cannabinoid exposure disrupts adult cocaine reward and phasic dopamine release.

**Wenzel JM\***, Zlebnik NE\*, Ayvazian V, Smethells JR, Cheer JF. Endocannabinoid signaling at fast-spiking interneurons in the nucleus accumbens core mediates impulsive choice.

\*co-first author

## AWARDS AND HONORS

- Gordon Research Conference Travel Award (2017)
- Dopamine Conference Travel Award (2016)
- The Society for Neuroscience Post-Doctoral Chapter Travel Award (2014)
- *The Journal of Neuroscience*, featured article (2014)
- Harry J. Carlisle Award (2012) for outstanding graduate work in Neuroscience & Behavior
- Doctoral Student Travel Grant (2011)
- Professional Development Grant (2009, 2011, 2012)

## TALKS/SEMINARS

- University of California Irvine, Addiction Neuroscience Symposium (2018)
- University of Maryland School of Medicine, Dept. of Anatomy & Neurobiology (2014, 2018)
- The Cannabis Science Podcast (2018)
- Morgan State University, ASCEND Scholars Seminar Series (2017)
- University of Maryland School of Medicine, Dean's Board of Visitors Meeting (2017)
- University of Maryland School of Medicine, Annual Program in Neuroscience Retreat (2017)
- University of Maryland School of Medicine, Program in Neuroscience Journal Club (2017)
- Carolina Cannabinoid Collaborative Conference (2015)
- Department of Anatomy & Neurobiology Second Monday Program (2014)
- Meeting of the International Society for Monitoring Molecules in Neuroscience (2014)

- University of California Santa Barbara, Dept. of Psychological and Brain Sciences (2010-2013)
- Arizona State University, Life Sciences Undergraduate Research Symposium (2005)

## **TEACHING EXPERIENCE**

### Instructor of Record (2015-2017)

Towson University (Towson Maryland)

Department of Biology

- Principles of Biology – An introductory biology course for non-majors

### Discussion Group Instructor (2017)

University of Maryland School of Medicine

Medical School

- Functional Systems – Responsible for weekly review sessions on cell physiology

### Discussion Group Instructor (2015)

University of Maryland School of Medicine

Medical School

- Topics in Medical Neuroscience – Co-created and directed a multi-session discussion group for medical students entitled, “Translational Neuroscience of Drug Addition”

### Guest Lecturer (2014)

University of Maryland School of Medicine

Graduate Program in Neuroscience

- Behavioral Neuroscience – Lectured on “Animal Models of Reward and Reinforcement” for a graduate survey course

### Instructor of Record (2013)

University of California Santa Barbara

The School of Scientific Thought (hands-on science courses for high school students)

- This is the Brain on Drugs: The Neuroscience of Addiction (2013) – A survey of topics in drug addiction and addiction research methods

### Instructor of Record (2010-2012)

University of California Santa Barbara

Department of Psychological and Brain Sciences

- Biological Basis of Psychology – An introductory biopsychology course
- Introduction to Experimental Psychology – A course in research methods
- Concepts in Biopsychology – An upper division course for biopsychology majors

### Teaching Assistant (2007-2012)

University of California Santa Barbara

Department of Psychological and Brain Sciences

- Endocrinology Laboratory (2010, 2011, 2013)
- Biopsychology Laboratory (2012)
- Motivation (2007, 2010, 2012)
- Conditioning and Learning (2010)
- Concepts in Biopsychology (2009, 2011)

- Introduction to Statistics (2009)
- Psychopharmacology (2008, 2009)
- Biological Basis of Psychology (2008, 2009)
- Introduction to Psychology (2008)

## **MENTORSHIP EXPERIENCE**

### University of Maryland School of Medicine:

Laboratory mentor for 19 undergraduate, post-baccalaureate, and graduate research assistants, including 9 students participating in mentorship programs

- ASCEND Research Mentor, Morgan State University (2017-Present)  
Morgan State University  
A Student-Centered, Entrepreneurship Development (ASCEND) training model to increase diversity in the biomedical research workforce
- Undergraduate Directed Research Mentor (2016-2018)  
Notre Dame of Maryland University
- Mentor for CIVICUS Capstone Internship, University of Maryland (2017)  
An academic program promoting citizenship, leadership, community-service learning, community building in a diverse society, and scholarship
- Mentor for Master's Student Research Externship (2016)  
Loyola University of Maryland
- Research Mentor for Graduate Program in Life Sciences Rotation Student (2015)  
University of Maryland School of Medicine
- Mentor for Interdisciplinary Internship (2014-2015)  
University of Maryland Baltimore County
- Research Mentor for Masters Program in Molecular Medicine Rotation Student (2014)  
University of Maryland School of Medicine
- Mentor MARC U\*STAR Program (2013-2014)  
University of Maryland Baltimore County  
A program supporting undergraduate scholars from underrepresented groups in biomedical and behavioral research

### University of California Santa Barbara:

Laboratory mentor for 12 undergraduate and 6 high school research assistants, including 8 students participating in mentorship programs

- Mentor for the McNair Scholars Program (2010-2013)  
A program preparing students from underrepresented groups to pursue graduate degrees
- Mentor for Undergraduate Research and Creative Activities Program (2010-2012)  
A program that supports independent undergraduate work in science and the arts

- Mentor for the Summer Research Mentorship Program (2009-2012)  
A summer program for college-bound high school students with hands-on research

## **PEDAGOGY TRAINING**

- Courageous Conversations: Fostering Inclusion, Towson University (2017)
- Collaborative Teaching Fellowship Seminar Series, Towson University (2015-2016)
- School of Scientific Thought Workshop, University of California Santa Barbara (2013)
- Summer Research Mentor Preparation, University of California Santa Barbara (2009)
- Teaching Training, University of California Santa Barbara (2007-2008)

## **PROFESSIONAL SERVICE**

- Reviewer (2013-Present)  
*Behavioral Neuroscience, Biological Psychiatry, Brain Research, Chemical Neuroscience, eLife, Frontiers in Neuroscience, Philosophical Transactions B, Physiology & Behavior, Psychopharmacology, Neuropharmacology, Neuropsychopharmacology, The Journal of Neuroscience*
- Postdoctoral Scholars Award Committee (2018)  
University of Maryland School of Medicine  
Review of award nominations and recommend awardees
- ASCEND Student Research Proposal Review Panel Member (2017)  
Morgan State University  
Review of and comments on student group research proposals
- Speaker at Informational Session for Collaborative Teaching Fellowships (2017)
- Brain Awareness Week Instructor (2015)  
Pointers Run Elementary, Columbia Maryland  
Led neuroscience activities designed for classes of 1<sup>st</sup>, 4<sup>th</sup>, and 5<sup>th</sup> graders
- Speaker at the National Brain Bee (2014)  
University of Maryland School of Medicine
- Member of the Institutional Animal Care and Use Committee (2010-2013)  
University of California Santa Barbara
- Brain Awareness Week Instructor (2008)  
Ellwood Elementary School, Goleta, California  
Led neuroscience activities designed for 1<sup>st</sup> graders

## **PROFESSIONAL MEMBERSHIPS**

- Society for Neuroscience Member (2005-Present)
- International Behavioral Neuroscience Society (2011-2012)
- Psi Chi National Honor Society (2003-2005)

**CONFERENCE ABSTRACTS**

30. **Wenzel JM**, Ayvazian V, Cheer JF (2018). Cannabinoid exposure in adolescence alters cocaine reward in adulthood to expedite binge use. The 48<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
29. Zlebnik NE, Cuesta S, Kummer S, **Wenzel JM**, Flores C, Cheer JF (2018). Cannabinoid exposure in adolescence dysregulates genes that orchestrate dopamine development and enhances cocaine-motivated behavior. The 48<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
28. Ayvazian V, Zlebnik NE, Bows A, **Wenzel JM**, Cheer JF (2018). Cocaine-induced increases in motivation are dependent on cannabinoid type-1 receptors. The 48<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
27. **Wenzel JM**, HM Dantrassy, EB Oleson, JF Cheer (2017). *Activation of ventral tegmental CB1 receptors is essential for avoidance learning*. The 47<sup>th</sup> Annual Meeting of the Society for Neuroscience, Washington, D.C.
26. **Wenzel JM**, Dantrassy HM, Gove WN, Oleson EB, Cheer JF (2017). *Midbrain endocannabinoids mediate avoidance learning through control of phasic dopamine signaling*. Gordon Research Conference on Cannabinoids, Waterville Valley, NH.
25. **Wenzel JM**, Gove WN, Chioma VC, Oleson EB, Cheer JF (2016). *2-Arachidonoylglycerol mobilization in the ventral tegmentum is required for accumbal dopamine release to cause avoidance behavior*. The 46<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
24. Zlebnik NE, **Wenzel JM**, Patton MH, Smethells JR, Mathur BN, Cheer JF (2016). *Chemogenetic inactivation of corticostriatal projections differentially disrupts impulsive choice in rats selected for high and low trait impulsivity*. The 46<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
23. **Wenzel JM**, Cole AB, Gove WN, Chioma VC, Oleson EB, Cheer JF (2016). *Optogenetic activation of ventral tegmental dopamine cells enhances extinction of fear conditioning*. Dopamine, Vienna, Austria.
22. **Wenzel JM**, Cheer JF (2016). *Cannabinoid exposure in adolescence, but not adulthood, modulates subsequent cocaine reward*. Marijuana and Cannabinoids: A Neuroscience Research Summit, Bethesda, MD.
21. **Wenzel JM**, Cheer JF (2015). *Cannabinoid exposure in adolescence modulates cocaine reward in adulthood*. 45<sup>th</sup> Annual Meeting of the Society for Neuroscience, Chicago, IL.
20. **Wenzel JM**, Oleson EB, Chioma VC, Gove WN, Ranganath A, Smith LN, Cheer JF (2014). *Optogenetic stimulation of ventral tegmental area dopamine cells facilitates operant shock avoidance behavior*. 44<sup>th</sup> Annual Meeting of the Society for Neuroscience, Washington, D.C.
19. **Wenzel JM**, Dominguez HM, Lane JE, Su Z-I, Ettenberg A (2013). *Norepinephrine signaling within the bed nucleus of the stria terminalis integral to the experience of the delayed negative effects of IV cocaine in rats*. 43<sup>rd</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
18. Ettenberg A, Fomenko V, Kaganovsky K, Shelton K, **Wenzel JM** (2013). *Individual differences in cocaine self-administration stem from the relative magnitude of the drug's positive and negative consequences*. 43<sup>rd</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.

17. Shelton K, **Wenzel JM**, Sved S, Kaiser JA, Ettenberg A (2013). *Kainic acid lesions of the lateral habenula reduce the anxiogenic response of cocaine in a runway model of drug self-administration*. 43<sup>rd</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
16. **Wenzel JM**, Lane JE, Su Z-I, Ettenberg A (2012). *Norepinephrine antagonism in the central nucleus of the amygdala blocks the development of conditioned place aversions stemming from the delayed negative effects of IV cocaine in rats*. 42<sup>nd</sup> Annual Meeting of the Society for Neuroscience, New Orleans, LA.
15. Shelton K, **Wenzel JM**, Dominguez HM, Su Z-I, Ettenberg A (2012). *Dopamine receptor antagonism blocks the positive, but not the negative, effects of IV cocaine in a conditioned place preference test*. 42<sup>nd</sup> Annual Meeting of the Society for Neuroscience, New Orleans, LA.
14. Ettenberg, A, **Wenzel, JM**, Su, Z-I, Waldroup, SA, Burgdorf JS (2012). *The immediate positive and delayed negative effects of IV cocaine are respectively associated with 50-kHz and 20-kHz ultrasonic vocalizations in rats*. 42<sup>nd</sup> Annual Meeting of the Society for Neuroscience, New Orleans, LA.
13. Su Z-I, Ghermezi M, **Wenzel JM**, Ettenberg A, Ben-Shahar O (2012). *Rats with a prior history of extended daily access to cocaine exhibited a diminished sensitivity to the positive but not the negative effects of cocaine in a Conditioned Place Preference test*. 42<sup>nd</sup> Annual Meeting of the Society for Neuroscience, New Orleans, LA.
12. Su Z-I, **Wenzel JM**, Ettenberg A, Ben-Shahar O (2012). *Extended access to cocaine increases the sensitivity to the negative, but not the positive, effects of cocaine in a conditioned place preference test*. 8<sup>th</sup> Federation of European Neuroscience Society Forum, Barcelona, Spain.
11. **Wenzel JM**, Su Z-I, Haber ZM, Ettenberg A (2012). *Norepinephrine antagonism in the extended amygdala reduces the approach-avoidance behavior of rats running an alley for IV cocaine*. 21<sup>st</sup> Annual Meeting of the International Behavioral Neuroscience Society. Kona, HI.
10. **Wenzel JM**, Su Z-I, Haber ZM, Ettenberg A (2011). *Noradrenergic antagonism within the extended amygdala attenuates the anxiogenic effects of cocaine in a self-administration runway model*. 41<sup>st</sup> Annual Meeting of the Society for Neuroscience, Washington, D.C.
9. Ettenberg A, **Wenzel J**, Waldroup S, Mueller C, Ben-Shahar O (2011). *BNST levels of  $\alpha$ 2268 immunoreactivity correlate with the frequency of approach-avoidance conflict behavior in a runway model of cocaine self-administration*. 41<sup>st</sup> Annual Meeting of the Society for Neuroscience, Washington, D.C.
8. Su Z-I, **Wenzel JM**, Santoostaroam A, Ettenberg A (2011). *Differential persistence of cocaine-induced conditioned place preferences and aversions after varying periods of drug abstinence*. 41<sup>st</sup> Annual Meeting of the Society for Neuroscience, Washington, DC.
7. **Wenzel JM**, Su Z-I, Haber ZM, Ettenberg A (2011). *Noradrenergic antagonism within the central nucleus of the amygdala attenuates the anxiogenic effects of acutely self-administered cocaine*. 8<sup>th</sup> International Brain Research Organization World Congress of Neuroscience, Florence, Italy.
6. **Wenzel JM**, Su Z-I, Haber ZM, Ettenberg A (2010). *Reversible lidocaine inactivation of the bed nucleus of the stria terminalis blocks the negative/anxiogenic effects of cocaine in a runway model of self-administration*. 40<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.



5. Su Z-I, **Wenzel JM**, Santoostaroam A, Hammond A, Kichaev G, Ettenberg A (2010). *Inactivation of the central nucleus of the amygdala blocks the anxiogenic effects of IV cocaine*. 40<sup>th</sup> Annual Meeting of the Society for Neuroscience, San Diego, CA.
4. **Wenzel JM**, Ettenberg A (2009). *Differential patterns of approach and avoidance behavior in rats running an alley for intra-accumbens versus intra-mPFC cocaine*. 39<sup>th</sup> Annual Meeting of the Society for Neuroscience, Chicago, IL.
3. **Wenzel JM**, Ettenberg A (2009). *Qualitative Differences in the Self-Administration of Rats Running an Alley for Intra-mPFC and Intra-NAcc Cocaine*. 71<sup>st</sup> Annual Meeting of the College on Problems of Drug Dependence, Reno, NV.
2. Acosta JI, Theil KJ, Browning JR, **Wenzel JM**, Neisewander JL (2006). *Influence of schedule of reinforcement on cue reinstatement of cocaine-seeking behavior*. 36<sup>th</sup> Annual Meeting of the Society for Neuroscience, Atlanta, GA.
1. Alleweireldt AT, Hobbs RJ, Johnson JA, Schell LA, **Wenzel JM**, Neisewander JL (2005). *A dopamine D3/D2 agonist, but not D1 or 5-HT<sub>2C</sub> agonists, infused into the central amygdala decreases cue- and cocaine-primed reinstatement*. 35<sup>th</sup> Annual Meeting of the Society for Neuroscience, Washington, D.C.

## REFERENCES

### **Aaron Ettenberg, Ph.D.**

Distinguished Professor of Neuroscience & Behavior  
Department of Psychological and Brain Sciences  
University of California Santa Barbara  
Santa Barbara, CA 93106  
aaron.ettenberg@psych.ucsb.edu  
805-893-3682

### **Joseph Cheer, Ph.D.**

Professor of Anatomy & Neurobiology  
Program in Neuroscience  
University of Maryland School of Medicine  
20 Penn Street  
Baltimore, MD 21201  
jcheer@som.umaryland.edu  
410-706-0112

### **Carl Lupica, Ph.D.**

Senior Investigator and Chief  
Electrophysiology Research Section  
National Institute on Drug Abuse  
333 Cassell Drive  
Baltimore, MD 21224  
clupica@mail.nih.gov  
443-740-2824

**Additional reference (focusing on pedagogical skills) available from:**

**Cynthia Ghent, Ph.D.**

Associate Professor of Biological Sciences-Science Education

Acting Director for STEM Education

Towson University

8000 York Road

Towson, Maryland 21252

cghent@towson.edu

410-704-5918