**BIOGRAPHICAL SKETCH**

NAME: Katherine Marie Serafine

eRA COMMONS USER NAME: Serafine

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING

| INSTITUTION AND LOCATION | DEGREE *(if applicable)* | Completion Date MM/YYYY | FIELD OF STUDY |
|---|---|---|---|
| Norwich University, Northfield, VT | B.A. | 05/2005 | Psychology |
| American University, Washington, DC | M.A. | 05/2009 | Psychology |
| American University, Washington, DC | Ph.D. | 05/2012 | Behavior, Cognition & Neuroscience |
| University of Texas Health Science Center at San Antonio (UTHSCSA), San Antonio, TX | Postdoc | 07/2015 | Pharmacology |

**A. Personal Statement**

My research program focuses on understanding the factors that contribute to individual vulnerability to diseases, including metabolic syndrome and related diseases (diabetes and obesity) and substance use disorders. My previous efforts in this area of research have resulted in 7 publications, and my efforts have revealed that, in addition to causing metabolic disease, eating a diet high in fat or sugar can dramatically enhance behavioral sensitivity to drugs acting on dopamine systems. In a related line of research, I also characterized the behavioral and discriminative stimulus effects of a drug that was recently FDA approved for the treatment of obesity (lorcaserin). Given the neuroanatomical and neurochemical overlap between obesity and substance use disorder, it is not surprising that this drug is being considered as a potential therapeutic for drug abuse.

Metabolic syndrome, obesity and substance use disorders are highly prevalent among Hispanic populations. My recent appointment as a tenure-track Assistant Professor at The University of Texas at El Paso (UTEP) places me in a unique position to establish an independent research career involving multidisciplinary collaborations with other investigators focused on metabolic disease as affiliated faculty in the Neuromodulation Unit of the Border Biomedical Research Center (BBRC). Within this unit, I am able to collaborate with animal researchers using rodent models of obesity and applying cutting-edge neuroscience techniques. Also, my affiliation with the BBRC also allows me to develop new translational collaborations with researchers studying obesity, metabolic syndrome and drug abuse among Hispanic human populations in the El Paso, Texas and Juarez, Mexico area. This work will advance our knowledge about the negative health consequences associated with eating a diet high in fat and will provide insight into the factors that contribute to increased vulnerability to disease among Hispanic individuals.

As a female Hispanic scientist, I am also passionate about increasing diversity in science, and providing access to excellent science education within my home state of Texas. I recognize the value of training the next generation of scientists, and I have continually mentored students in the laboratory. UTEP, a Hispanic serving institution, is an ideal location to provide hands-on laboratory training and research opportunities to the next generation of Hispanic scientists. I look forward to developing further as a mentor by training students and postdoctoral fellows in behavioral neuroscience to answer scientific questions about individual differences in vulnerability to disease.

## B. Positions and Honors

**Positions and Employment**

2005 Laboratory **Teaching Assistant**, Department of Psychology, Norwich University, Northfield, VT
2005-2006 **Substitute Teacher**, Communications Arts High School, Northside Independent School District, San Antonio, TX
2006-2012 Graduate **Research Assistant**, Department of Psychology, American University, Washington, DC
2009-2012 **Adjunct Faculty**, Department of Psychology, American University, Washington, DC
2009-2010 **Research Assistant**, Department of Psychology, Uniformed Services University of the Health Sciences, Bethesda, MD
2011 **Adjunct Faculty**, Department of Psychology, George Washington University, Washington, DC
2011 Summer **Research Fellow**, Molecular Neurobiology Branch, National Institute on Drug Abuse, Baltimore, MD
2012-2015 **Postdoctoral Fellow**, Department of Pharmacology, UTHSCSA, San Antonio, TX
2015- **Assistant Professor, tenure track**, Department of Psychology, University of Texas at El Paso, El Paso, TX

**Academic and Professional Honors**

2005 **Research Award**, Norwich University Friends of the Kreitzberg Library
2009 **Poster Award**, American University College of Arts and Sciences
2011 Summer **Research Fellowship** at the National Institute on Drug Abuse (NIDA), Research and Training Program for Underrepresented Populations
2011 Francis C. Colpaert **Poster Award**, Society for Stimulus Properties of Drugs
2012 Outstanding Postdoctoral **Poster Award**, University of Texas Health Science Center at San Antonio Pharmacology Graduate Student Symposium
2013-2015 Ruth L. Kirschstein **National Research Service Award** (NRSA), Postdoctoral Training Fellowship in Drug Abuse Research: Behavior and Neurobiology (T32 DA031113)
2014 Barbara A. Bowman **Postdoctoral Research Scholarship Award**, UTHSCSA Graduate School of Biomedical Sciences
2015 **Washington Fellow** Science Policy/Advocacy program, American Society for Pharmacology and Experimental Therapeutics (ASPET)
2015 Postdoctoral Fellow **Poster Award**, Behavioral Pharmacology Division Best Abstract, ASPET
2015 1st place **Poster Award**, Center for Biomedical Neuroscience, UTHSCSA
2015 **Mentoring Institute for Neuroscience Diversity (MIND) Scholar,** Early career faculty mentoring program for underrepresented minorities

**Memberships in professional societies:**

2004 – Psi Chi National Honor Society in Psychology
2009 – American Society for Pharmacology and Experimental Therapeutics (ASPET)
2011 – Society for Stimulus Properties of Drugs
2011 – American Psychological Association, Division 28: Psychopharmacology & Substance Abuse
2013 – 2015 UTHSCSA Postdoctoral Association, Finance Committee Chair, 2013-2015
2013 – 2015 National Postdoctoral Association
2014 – American Association for the Advancement of Science
2014 – Society for Neuroscience
2015 – Behavioral Pharmacology Society
2015 - Affiliated Faculty, Border Biomedical Research Center, University of Texas at El Paso
2016 - National Hispanic Science Network

**Mentorship experience:**

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| 2010 - 2012 | Maria Briscione, Undergraduate Student, American University |
| 2011 - 2012 | Andrew Merluzzi, Undergraduate Student, American University |
| 2012 | Amandine Grenier, Summer Undergraduate Student, UTHSCSA |
| 2012 - 2013 | Todd Bentley, Health Careers High School Student, UTHSCSA |
| 2013 - 2014 | Dylan Kilborn, Health Careers High School Student, UTHSCSA |
| 2014 | Ghazal Saleh, Health Careers High School Student, UTHSCSA |
| 2015 | Caitlin Labay, ASPET Summer Undergraduate Research Fellow, UTHSCSA |
| 2015 | Sarah Rodarte, NIH BUILD undergraduate scholar, UTEP |
| 2015 - | Jeremiah Ramos, Graduate Student, UTEP |
| 2015 - | Caroline Hernandez-Casner, Undergraduate Student, UTEP |
| 2016 | Alicia Lopez, Undergraduate Student, UTEP |
| 2016 | Adriana Rico, Undergraduate Student, UTEP |
| 2016 | Claudia Woloshchuk, Summer Undergraduate Student, UTEP |
| 2016 | Carli Poisson, Summer Undergraduate Student, UTEP |
| 2016- | Edith Hernandez, Undergraduate Student, UTEP |
| 2016- | Ivan Herrejon, Undergraduate Student, UTEP |
| 2016- | Adrian Gonzales, Undergraduate Student, UTEP |
| 2016 - | Samirah Hussein, Graduate Student, UTEP |
| 2017- | Nina Beltran, Undergraduate Student, UTEP |
| 2017 | Grace Flores-Robles, NIH BUILD summer undergraduate scholar, UTEP |
| 2017- | Kayla Galindo, Graduate Student, UTEP |

**Student/Trainee Awards:**

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|---|---|
| 2013 | Maria Briscione – ASPET, Behavioral Pharmacology Division Best Abstract Competition, 2nd place Undergraduate **Poster Award** |
| 2016 | Jeremiah Ramos – ASPET **Travel Award**, to present poster at Experimental Biology meeting in San Diego, CA |
| 2016 | Caitlin Labay - ASPET Summer Undergraduate Research Fellow **Travel Award**, to present poster at Experimental Biology meeting in San Diego, CA |
| 2016 | Caitlin Labay - ASPET, Behavioral Pharmacology Division Best Abstract Competition, 1st place Undergraduate **Poster Award** |
| 2016 | Carli Poisson – UTEP Campus Office of Undergraduate Research Initiatives (COURI) summer symposium, Physics & Natural Sciences Division, 1st place **Poster Award** |
| 2017 | Caroline Hernandez-Casner – ASPET **Travel Award**, to present poster at Experimental Biology meeting in Chicago, IL |
| 2017 | Caroline Hernandez-Casner – UTEP COURI spring symposium, Life Sciences Division, 1st place **Poster Award** |

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**C. Contribution to Science** *indicates student/trainee authors

1. *The impact of eating a high fat diet on drug sensitivity: An in vivo model of dopamine system dysfunction*

Eating a diet high in fat or sugar can cause several negative health consequences, including obesity and type 2 diabetes. Over the last several years, I have demonstrated that eating a diet high in fat or sugar can also impair dopamine systems. Specifically, rats eating a high fat or a high sugar diet are more sensitive to drugs acting directly (e.g., dopamine receptor agonists) and indirectly (e.g., cocaine) on dopamine receptors. These changes in drug sensitivity, measured by examining the behavioral effects of dopamine drugs, represent a robust, replicable, efficient *in vivo* tool to assess how environmental factors (e.g., diet) can influence dopamine neurochemistry. These experiments serve as the foundation for my independent research career at UTEP, where I am currently focusing on using these behavioral assessments as potential early indicators of metabolic disease. My current work in this area involves investigating potential treatments and preventative strategies (e.g., dietary supplements like fish oil) to reduce these negative consequences (obesity, diabetes, and dopamine system dysfunction) associated with eating a diet high in fat.

a. **Serafine KM**, ***Bentley TA, Koek W, France CP. (2014) Eating high fat chow, but not drinking sucrose or saccharin, enhances the development of sensitization to the locomotor effects of cocaine in adolescent female rats. *Behav Pharmacol,* 26: 321-325. PMID: 25485647

b. **Serafine KM**, ***Bentley TA, ***Grenier AE, France CP. (2014) Eating high fat chow and the behavioral effects of direct- and indirect-acting dopamine receptor agonists in female rats. *Behav Pharmacol*, 25:287-295. PMID: 24949571

c. **Serafine KM,** *Labay C, France CP. (2016) Dietary supplementation with fish oil prevents high fat diet-induced enhancement of sensitivity to the locomotor stimulating effects of cocaine in adolescent female rats. *Drug Alcohol Depend*, 165: 45-52. PMID: 27242289

d. *Hernandez-Casner C, *Ramos J, **Serafine KM** (2017) Dietary supplementation with fish oil prevents high fat chow-induced enhancement of sensitivity to the behavioral effects of quinpirole. *Behav Pharmacol*, Epub ahead of print. Doi: 10.1097/FBP.0000000000000322. PMID: 28574870

2. *Characterization of the behavioral and discriminative stimulus effects of lorcaserin*

The FDA recently approved a pharmacotherapy, lorcaserin, for the treatment of obesity, since it decreases feeding in both humans and animals. Interestingly, there are striking similarities between obesity and drug abuse, both in terms of neuroanatomical substrates involved, as well as neurochemical systems impacted in both disease states. As such, there is strong interest in determining if lorcaserin, might also be an effective therapeutic for substance use disorder. Although the *in vitro* pharmacological effects of lorcaserin have been well characterized, the *in vivo* effects of lorcaserin have not been as fully described. I have recently conducted two assessments in rats to characterize the behavioral effects of lorcaserin using unconditioned behavior, and the discriminative stimulus effects of lorcaserin using drug discrimination. The results of these projects revealed a complex pharmacological profile, involving agonist effects at not only 5-$HT_{2C}$, but also effects that are consistent with agonist activity at 5-$HT_{2A}$ and $_{1A}$ receptor subtypes. Specifically, using unconditioned behavioral effects, we demonstrated that like drugs with agonist effects at 5-$HT_{1A}$ receptors, large doses of lorcaserin induced forepaw treading. In the drug discrimination assay, drugs with agonist effects at 5-$HT_{1A}$ receptors (e.g., 8-OH-DPAT) fully substituted for lorcaserin in almost all subjects tested. Similar results were revealed suggesting lorcaserin also has agonist effects at 5-$HT_{2A}$ receptors, and the 5-$HT_{2A}$ receptor agonist DOM fully substituted for the discriminative stimulus effects of lorcaserin in 7/8 rats. Given that drugs with agonist effects at 5-$HT_{2A}$ receptors often have abuse liability of their own (e.g., LSD), it is crucial to fully understand the behavioral effects of lorcaserin if it is to be considered a potential pharmacotherapy for substance use disorder.

a. **Serafine KM**, Rice KC, France CP. (2015) Directly observable behavioral effects of lorcaserin in rats. *Journal of Pharmacology and Experimental Therapeutics*, 355: 381-5. PMID: 26384326.

b. **Serafine KM,** Rice KC, France CP. (2016) Characterization of the discriminative stimulus effects of lorcaserin in rats. *Journal of the Experimental Analysis of Behavior*, 106(2): 107-116. PMID: 27640338

3. *The underlying neurochemical mediation of the aversive effects of cocaine*

Although drugs of abuse are often discussed in terms of their rewarding or reinforcing effects, drugs like cocaine also produce aversive effects that can be studied using classical conditioning procedures. Interestingly, prior history with the drug can actually reduce latent aversive effects induced by the same drug: a phenomenon known as “unconditioned stimulus (US) pre-exposure” or “tolerance” to the conditioned aversive effects. In a series of experiments conducted between 2009 and 2012, I investigated pre-exposure effects using cocaine, a non-selective monoamine transporter inhibitor and several drugs with direct or indirect effects on dopamine, serotonin and norepinephrine receptors, in order to determine if “cross-tolerance” between drugs might reveal mechanistic information about the aversive effects of these drugs. Collectively this work yielded convincing evidence that similar to the rewarding effects of cocaine, dopamine also mediates the aversive effects of cocaine. Most notable, is the evidence that norepinephrine and serotonin systems can in turn have a

modulatory role on cocaine as well, providing non-dopaminergic therapeutic avenues to pursue for cocaine use disorder.

a. **Serafine KM**, Riley AL. Cocaine-induced conditioned taste aversions: Role of monoamine reuptake inhibition. In Hall, FS. ed. 2013 *Serotonin: Biosynthesis, Regulation and Health Implications*, Hauppauge, NY: NOVA Science Publishers, Inc. ISBN: 978-1-62417-636-4 Available here.

b. **Serafine KM**, Riley AL. (2009) Possible role of norepinephrine in cocaine-induced conditioned taste aversions. *Pharmacol Biochem Behav*, 92: 111-116. PMID: 19027784

c. **Serafine KM**, *Briscione MA, Riley AL. (2012) The effects of haloperidol on cocaine-induced conditioned taste aversions. *Physiol Behav*, 105: 1161-1167. PMID: 22212241

d. **Serafine KM**, *Briscione MA, Rice KC, Riley AL. (2012) Dopamine mediates cocaine-induced conditioned taste aversions as demonstrated with cross-drug preexposure to GBR 12909. *Pharmacol Biochem Behav*, 102: 269-274. PMID: 22579912

Complete list of peer reviewed publications on *MyBibliography*:
https://www.ncbi.nlm.nih.gov/sites/myncbi/1ZEMlY0bbbnkg/bibliography/48855152/public/?sort=date&direction=ascending

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**D. Research Support**

*Current Research Support*

2016-2018 Rising Faculty Science and Technology Acquisition and Retention (STARs) Program Grant,
Description: Research funds for recruiting new faculty from The University of Texas Systems
**Role: Principal Investigator**

*Pending Research Support*

2018-2020 NIH Support of Competitive Research (SCORE) Program (SC2) Pilot Project Award,
Description: Application submitted in June 2017 to investigate a behavioral assay as a novel early screen for metabolic syndrome.
**Role: Principal Investigator**

*Completed Research Support*

2013-2015 T32 DA031115: Training in Drug Abuse Research: Behavior and Neurobiology, France (PI)
Description: This postdoctoral training program addresses the well-recognized need for addiction scientists with interdisciplinary training.
**Role: Recipient of T32 Postdoctoral Fellowship**