

***Cedric L. Williams***

**Univ. of Virginia, Dept. of Psychology (*Division of Neuroscience & Behavior*)**

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**Charlottesville, VA 22904**

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## **EDUCATION**

Ph.D., Southern Illinois University. Physiological Psychology. March, 1991.

M.A., Southern Illinois University. Physiological Psychology. August, 1988.

B.A., North Carolina A & T State University. Psychology. December, 1984.

## **EXPERIENCE**

**University of California-Irvine, Dept. of Neurobiology & Behavior:**

**Postdoctoral Researcher:** Center for the Neurobiology of Learning and Memory (1991-1995).

**University of Virginia, Dept. of Psychology:**

**Assistant Professor** (1995-2001)

**Associate Professor** (2001-2008)

**Director of Graduate Studies** (2002-2008)

**Professor** (2008-present)

**<http://bims.virginia.edu/faculty/cedric-l-williams/>**

**LAB FOCUS 1:** To meet the objectives of the U. S. Army, the Williams' Lab is involved in a collaborative effort with Barron and Assoc. LLC, to train African Giant Pouched Rats and standard laboratory rodents to detect target scents associated with explosive odorants using automated methods. Our lab coordinates all activities related to designing, updating, providing quantitative analysis and implementing the behavioral components of olfactory discrimination learning in the detection of hidden explosives. The objective of this work is to discover novel behavioral strategies that reduce the time frame for training African Gambian and laboratory rats to reliably search for, identify and distinguish TNT explosive residues from a number of distractor odors. The research team is also involved in developing an Automated Deployable Robust Training (ADROIT) system that can be deployed in the field to reduce the human labor and time associated with producing explosive detecting rodents. This computer driven apparatus is used to automatically administer a series of operant and instrumental learning techniques to shape unique forms of olfactory discrimination learning necessary to detect harmful odorants.

**LAB FOCUS 2:** Research interests are centered on understanding the relationship

between emotionally arousing events and their capacity to modulate brain systems that encode new experiences into memory. We examine the role of brainstem nuclei in receiving synaptic input regarding changes in peripheral autonomic states and conveying this information to limbic system structures that regulate memory formation. We use a battery of behavioral learning tasks to examine interactions between these systems and also measure changes in neurotransmitter release occurring in limbic structures during the memory storage process.

**National Science Foundation: (2009-2011)**

**Program Director** (Rotating); Neural Systems Program  
Directorate of Biological Sciences  
Division of Integrative Organismal Systems (IOS)  
Arlington, VA

**HONORS AND AWARDS**

DARPA (2016-2019). "Genetic Selection for Accelerated Learning and Olfactory Detection of Explosives".

DOD; Army Research Office (2016-2017): "Facilitation of Olfactory Discrimination & Generalization Learning in the African Gambian Rat."

DOD; US Army RDECOM ACQ Center Research Grant Award (2012-2018). "*STTR Phase II-Automated Deployable Robust Training (ADROIT) System*".

ElectroCore Neuroscience Corp. LLC; Williams, C. L. (2013-2015). "*Efficacy of non-invasive vagal nerve stimulation on facilitating extinction of conditioned fear*".

Psychology Dept., Outstanding Faculty Member of the Year Award, (2013).

National Science Foundation: Intergovernmental Personnel Act (IPA) Assignment Grant Award (2009-2011).

National Science Foundation: Div. of Integrative Organismal Systems, Director's Achievement Award for Broadening Participation of Groups Underrepresented in Science (2010).

National Science Foundation, Research Grant Award (2007-2011) "Peripheral and Central Correlates of Arousal & Memory".

National Institutes of Health, R01 Research Award. (2001-2006). "Noradrenergic Modulation of Memory Storage".

American Psychological Association: Alumni Achievement Award: Diversity Program in Neuroscience. 2003

National Institutes of Health, K01 Scientist Development Award. 1997-2002.

American Psychological Association, Postdoctoral Fellowship. 1994.

University of California, President's Postdoctoral Research Award. 1991-1993.

National Science Foundation, Postdoctoral Research Award. 1991.

Illinois Graduate Incentive Fellowship Research Award. 1985-1989.

### **NATIONAL SERVICE**

Editorial Board: *Neurobiology of Learning and Memory* (2013-present).

Editorial Board: *Frontiers in Behavioral Neuroscience* (2012-present).

National Advisory Board for **BRAINS** (*Broadening the Representation of Academics in NeuroScience*). Diversity Research Education Grants in Neuroscience (R25), Univ. of Washington (2010-2016).

Grant Review Panel Member: National Institutes of Health: ***Sensory and Motor Neuroscience, Cognition and Perception*** ZRG1 FO2B-M (2012-present).

Grant Review Panel Member: National Science Foundation: Science and Technology Centers Review Panel (2012-2014).

Society for Neuroscience: ***Professional Development Committee***: (2009-2012)

Grant Review Panel Member: National Institutes of Health: ***Neurobiology of Learning and Memory*** Study Section (LAM; 2005-2009).

Grant Review Panel Member: National Science Foundation: ***Behavioral Neuroscience & Neuroendocrinology Study Section*** (2004-2009).

Grant Review Panel Member: Department of Defense. ***National Defense Science & Engineering Grants*** (Chairperson 2004-2006).

Grant Review Panel Member: ***NIH Behavioral & Biobehavioral Processes F12A***; (2005).

NIH; National Institute of Neurological Disorders and Stroke, ***NST Review Study Section*** (2004-2005).

External Scientific Advisory Committee: Florida A & M University (**MINORITY BIOMEDICAL RESEARCH SUPPORT (MBRS)** program (2004-present)).

Grant Review Panel Member: **National Science Foundation Graduate Fellowships**  
(Chairperson 2004-2006).

## **PUBLICATIONS**

### **MANUSCRIPTS IN REFEREED JOURNALS**

Williams, C. L., and McGaugh, J. L. (1992). Reversible inactivation of the nucleus of the solitary tractus impairs retention performance in an inhibitory avoidance task. Behavioral and Neural Biology, 54, 204-210.

Packard, M. G, Williams, C. L., and McGaugh, J. L. (1992). Enhancement of win-shift radial maze retention by peripheral posttraining administration of d-amphetamine and 4-OH amphetamine. Psychobiology, 20, 280-285.

Gilbert, D. G., Meliska, C. J., Williams, C. L., and Jensen, R. A. (1992). Subjective correlates of smoking-induced elevations of plasma beta-endorphin and cortisol. Psychopharmacology, 106, 275-281.

Williams, C. L. and McGaugh, J. L. (1993). Reversible lesions of the nucleus of the solitary tract attenuate the memory-modulating effects of posttraining epinephrine. Behavioral Neuroscience, 107, 1-8.

McGaugh, J. L., Introini-Collison, I. B., Cahill, L. F., Castellano, C., Dalmaz, C., Parent, M. B., Williams, C. L. (1993). Neuromodulatory systems and memory storage: Role of the amygdala. Behavioral and Brain Sciences, 58, 81-90.

Williams, C. L. and Jensen, R. A. (1993). Effects of vagotomy on leu-enkephalin-induced impairments in memory storage. Physiology and Behavior, 54, 659-663.

Williams, C. L., and McGaugh, J. L. (1994). Enhancement of memory processing in an inhibitory avoidance and radial maze task by posttraining infusion of bombesin into the nucleus tractus solitarius. Brain Research, 654, 251-256.

Williams, C. L., Packard, M. G., and McGaugh, J. L. (1994). Amphetamine facilitation of win-shift radial arm maze retention: The involvement of peripheral adrenergic and central dopaminergic systems. Psychobiology, 22, 141-148.

Nogueira, P., Tomaz, C., and Williams, C. L. (1994). Contribution of the vagus nerve in mediating the memory-facilitating effects of substance P. Behavioural Brain Research, 62, 165-169.

Salinas, J. A., Williams, C. L., and McGaugh, J. L. (1996). Peripheral posttraining administration of 4-OH amphetamine enhances long-term retention of a reduction in reward magnitude. Neurobiology of Learning and Memory, 65, 192-195.

- Williams, C. L., Men, D., Clayton, E. C., and Gold, P. E. (1998). Norepinephrine release in the amygdala following systemic injection of epinephrine or escapable footshock: contribution of the nucleus of the solitary tract. Behavioral Neuroscience, 112, 1414-1422.
- Rooszendaal, B., Williams, C. L., and McGaugh, J. L. (1999). Glucocorticoid receptor activation in the rat nucleus of the solitary tract facilitates memory consolidation: Involvement of the basolateral amygdala. European Journal of Neuroscience, 11, 1317-1323.
- Clayton, E. C. and Williams, C. L. (2000). Adrenergic activation of the nucleus tractus solitarius potentiates amygdala norepinephrine release and enhances retention performance in emotionally-arousing and spatial memory tasks. Behavioural Brain Research, 112, 151-158.
- Clayton, E. C. and Williams, C. L. (2000). Posttraining inactivation of excitatory afferent input to the locus coeruleus impairs retention in an inhibitory avoidance learning task. Neurobiology of Learning and Memory, 73, 127-140.
- Williams, C. L., Men, D., and Clayton, E. C. (2000). The effects of noradrenergic activation of the nucleus tractus solitarius on memory and in potentiating norepinephrine release in the amygdala. Behavioral Neuroscience, 114, 1131-1144.
- Clayton, E. C. and Williams, C. L. (2000). Glutamatergic Influences on the Nucleus Paragigantocellularis: Contribution to Performance in Avoidance and Spatial Memory Tasks. Behavioral Neuroscience, 114, 707-712.
- Clayton, E. C. and Williams, C. L. (2000). Noradrenergic receptor blockade of the NTS attenuates the mnemonic effects of epinephrine in an appetitive light-dark discrimination learning task. Neurobiology of Learning and Memory, 74, 135-145.
- Miyashita, T. and Williams, C. L. (2002). Glutamatergic transmission in the nucleus of the solitary tract modulates memory through influences on amygdala noradrenergic systems. Behavioral Neuroscience, 116, 13-21.
- Miyashita, T. and Williams, C. L. (2003). Enhancement of noradrenergic neurotransmission in the nucleus of the solitary tract modulates memory storage processes. Brain Research, 987, 164-175.
- Hassert, D.L., Miyashita, T., & Williams, C. L. (2004). The Effects of Peripheral Vagal Nerve Stimulation At A Memory Modulating Intensity on Norepinephrine Output in the Basolateral Amygdala. Behavioral Neuroscience, 118, 79-88.
- Miyashita, T., & Williams, C. L. (2004). Peripheral Arousal-related Hormones Modulate Norepinephrine Release in the Hippocampus via Influences on Brainstem Nuclei. Behavioural Brain Research, 153, 87-95. PMID: 15219710

- Miyashita, T. & Williams, C. L. (2006). Epinephrine Administration Increases Neural Impulses Propagated Along the Vagus Nerve: Role of Peripheral Beta-Adrenergic Receptors. *Neurobiology of Learning and Memory*, 85, 116-124. PMID: 16230035
- Williams, C. L. & Miyashita, T. (2006). The role of peripheral adrenergic receptors in mediating epinephrine-induced changes in vagal nerve firing. *Neurobiology of Learning and Memory*, 86, 356-357.
- Kerfoot, E. C., Chatillion, E. & Williams, C. L. (2008). Functional interactions between the nucleus tractus solitarius and nucleus accumbens shell in modulating memory for arousing events. *Neurobiology of Learning and Memory*, 89, 47-60. PMID: 17964820
- King, S. O. II & Williams, C. L. (2009). Novelty-induced arousal enhances memory for classical fear conditioning: Interactions between peripheral adrenergic and brainstem glutamatergic systems. *Learning and Memory*, 16(10): 625-34. PMID: 19794188
- Young, E. J. & Williams, C. L. (2010). Valence Dependent Asymmetric Release of Norepinephrine in the Basolateral Amygdala. *Behavioral Neuroscience*, 124, 633-644. PMID: 20939663
- Kerfoot, E. C. & Williams, C. L. (2011). Interactions between the Brainstem Noradrenergic Neurons and the Nucleus Accumbens Shell in Modulating Memory for Emotionally Arousing Events. *Learning and Memory*, 18, 405-413. PMID: 21602321
- McIntyre, C.K., Williams, C. L. & McGaugh, J. L. (2012). Interacting Brain Systems Modulate Memory Consolidation. *Neuroscience and Biobehavioral Reviews*. 36, 1750-1762. PMID: 22085800
- Chen, C. & Williams, C. L. (2012). Interactions Between Epinephrine, Ascending Vagal Fibers and Central Noradrenergic Systems in Modulating Memory for Emotionally Arousing Events. *Frontiers in Behavioral Neuroscience*, 6: 35; 1-20. PMID: 22754515
- Park, S. M. & Williams, C. L. (2012). Contribution of Serotonin Type-3 Receptors in the Successful Extinction of Cued or Contextual Fear Conditioned Responses: Interactions with GABAergic Signaling. *Reviews in Neurosciences*, 23, 555-569. PMID: 23087085
- Young, E. J. & Williams, C. L. (2013). Differential Activation of Amygdala Arc Expression By Positive and Negatively Valenced Emotional Learning Conditions. *Frontiers in Behavioral Neuroscience*, v7, 7:191. PMID: 24367308
- Kerfoot, E. C. & Williams, C. L. (in press). Consequences of Activating Noradrenergic Inputs to Either the Amygdala or Hippocampus are Mediated within the Nucleus Accumbens Shell. *Frontiers in Pharmacology*.

### BOOK CHAPTERS

Williams, C. L., and Jensen, R. A. (1991). *Vagal afferents: A possible mechanism for the modulation of peripherally acting agents*. In R. C. A. Frederickson and J. L. McGaugh (Eds.), Peripheral Signaling of the Brain in Neural-Immune and Cognitive Function. Lewiston, New York: Hogrefe & Huber Publishers.

Packard, M. G., Williams, C. L., Cahill, L., and McGaugh, J. L. (1995). *The anatomy of a memory modulatory system: From periphery to brain*. In Spear, Spear, Woodruff (Eds.), Learning Development and Response to Brain Insults. New Jersey: Lawrence Erlbaum Publishers.

Eichenbaum, H. B., Cahill, L. F., Gluck, M. A., Hasselmo, M. E., Keil, F. C., Martin, A. J., McGaugh, J. L., Murre, J., Myers, C., Petrides, M., Roozendaal, B., Schacter, D. L., Simons, D. J., Smith, W. C. and Williams, C. L. (1999). *Learning and Memory: Systems Analysis*. In Zigmond, M. J., Bloom, F. E., Landis, S. C., Roberts, J. L., and Squire, L. R. (Eds.) Fundamental Neuroscience. Academic Press.

Williams, C. L. and Clayton, E. C. (2001). *The contribution of brainstem structures in modulating memory storage processes*. In P. E. Gold and B. Greenough (Eds.), Memory Consolidation: Essays in Honor of James L. McGaugh. American Psychological Association Press.

King, S. O. & Williams, C. L. (2017). An understanding of how novelty induced changes in arousal, impacts brain neurotransmitters systems to facilitate memory formation processes. In *The Brainstem and Behavior*. Edited by R. Lalonde. Nova Science Publishers

### TEACHING EXPERIENCE

**Instructor.** University of Virginia, Charlottesville, VA. **"Brain Systems Involved in Learning and Memory"**: Upper division and graduate level course that surveys historical and current experimental findings on the functional contribution of neuroanatomical structures, neurotransmitter and second messenger systems in regulating memory storage. 1995-present.

**Instructor.** University of Virginia, Charlottesville, VA. **"Introduction to Learning and Behavior"**: Primarily undergraduate course that explores the complex nature of learning and variables influencing behavior by surveying theories of classical conditioning, associative learning and operant responding. 1995 to present.

**Psychobiology Instructor.** University of California, Irvine. Instructor for junior and senior level seminar entitled *"Contribution of Neurochemical Systems in the Modulation of Learning and Memory"*. 1994

**Biological Sciences Instructor.** University of California, Irvine. California Alliance for Minority Participation (Summer Research Academy). Developed and taught science lecture and laboratory exercises for incoming freshman biological sciences majors. 1993

**Instructor.** John A. Logan College, Carterville, IL. Taught *"Theories of Personality"* to junior and senior level undergraduate students. 1989-1990

**Instructor.** Southern Illinois University, Department of Psychology. Taught introductory course entitled “*Biological Psychology*” for undergraduate students majoring in psychology, biology, or physiology. 1987

### **UNIVERSITY SERVICE**

Provost’s Task Force on “Non-tenure Track Faculty” Committee (2015-2016).  
Faculty Mentor for the Student/Faculty Mentoring Program (1996-present)  
Freshman and Transfer Student Advisor (2001-present)  
Thomas Jefferson Award Committee (2008-present)  
Leadership in Academic Matters (Higher Administration Training Program Sponsored by Vice Provost for Faculty Advancement; 2009)  
Faculty Senate (Psyc. Dept. Representative) (2002-2008)  
Academic Affairs Committee (2003-2009)  
Committee For Faculty Rules (2001-2006; Chairman 2005-2006)  
Vivarium Advisory Board (2001-2006)  
Postdoctoral Advisory Council (Office of the VP for Research and Graduate Studies; 2006-2009)  
Course Evaluation Comm. (2004)  
Advisory Committee for the Office of African American Affairs (1998)

### **DEPARTMENTAL SERVICE**

Neuroscience & Behavior Area Head (2007- 2009; 2012-present).  
Director of Graduate Programs (Psychology)Studies (2002-2008).  
Steering Committee (2002-2008).  
Undergraduate Committee (2000-2008).  
Graduate Committee (1999-2007).  
Minority and Ethnic Relations Committee (1996-present).

**Faculty Ph.D. Advisor (year Ph.D. awarded in parenthesis):** Edwin C. Clayton (2000); Teiko Miyashita (2003); Chiao-Chi Chen (2007); Erin Kerfoot (2009); Erica J. Young (2010); Stanley O. King, II (2010); Su Mi Park (2012).

**Faculty Thesis Advisor:** Directed Senior Research Thesis for Psychology and Cognitive Science honor students in the “**Distinguished Majors Program** ”:  
Hira Mohyuddin, 2017; Kamni Kilpathi, 2015-*Awarded the best undergraduate scientific research project at UVA for 2014-15*; Elizabeth Chatillion, 2008; Nicole Buxhoevendend, 2006; Michael Montana, 2004; Amanda Gabriele, 2003; Joanna Gelfman, 2002; Kelly Stoehs, 2001; Serge Grigoriev; 2000; Samantha Gavin; 1999).

### **PROFESSIONAL MEMBERSHIPS**

Society for Neuroscience



Phi Kappa Phi National Honor Society  
Golden Key National Honor Society

### **INVITED PRESENTATIONS**

**Council for Undergraduate Research**, Washington, DC., Professional Development Workshop on Developing Lasting Research Programs (Feb. 2017).

**Utah Valley Univ.**, Orem, UT, “Professional Development Workshop on Grantsmanship” (March, 2016).

**National Institute for Neurological Disease and Stroke**, (Bethesda, MD. Panel Member for NINDS sponsored Grant Writing Workshop for Diverse Researchers Conference (July 2014).

**Univ. of Washington**, Seattle, WA. *Broadening the Representation of Academics in Neuroscience Conference*), Panel Member for “Mastering Teaching; Career Life Balance as a Scientist” (Sept. 2014).

**Medical College of Georgia**, Dept. of Pharmacology & Toxicology, Augusta, GA. “Contributions of Peripheral and Central Mechanisms in Memory Formation for Emotional Events”. (April 2013)

**Council for Undergraduate Research**, Washington, DC. “*Beyond the Basics in Research and Grant Writing*”. (Feb. 2013).

**St. Jude Children’s Research Hospital**, Memphis, TN. “*Career Development Workshop*” for Graduate and Postdoctoral Researchers. (November 2011).

**Emory University School of Medicine**, Atlanta, GA. “Interactions Between the Periphery and Brain Contribute to the Impact of Emotional Arousal on Memory”. (October 2011).

**Alabama A & M University**, Served as part of the NSF delegation to the White House Initiative on HBCU’s. Participated in NSF presentation and served as a panel member for faculty and researchers from the various southern region HBCU’s represented at the conference (Huntsville, AL, Alabama A & M. University, April 2010)

**Society for Neuroscience 2010 Annual Meeting**, San Diego, CA. “**Meet the Experts**”; presentation of current research and overview of factors influencing my career in the field of Neuroscience (Nov. 2010).

**National Leadership Alliance**, East Brunswick, N.J. “Participated in Multiple Workshops providing career information and mentoring for Junior Professors, Post doctoral researchers and students at the undergraduate and graduate level” (August 2010).

**College of William & Mary**, Williamsburg, VA. “Richmond Area Outreach; Opportunities and Programs within the Biological Sciences at the National Science Foundation”. (May 2010).

**University of Virginia**, Charlottesville, VA. Keynote Speaker; Holland Scholars Banquet (March 2010).

**Indiana Univ. (IUPUI)**, Indianapolis, IN. Organization and Funding Opportunities in the Directorate for Biological Sciences (Nov. 2009).

**Spelman College**, Atlanta, GA. Atlanta Univ. Consortium Annual Research Day. Strategies for Successful Entry Into Postgraduate Education. (March 2008).

**Winter Conference on the Neurobiology of Learning and Memory**, Park City, Utah. Emotional arousal and enhanced memory: Mediation of peripheral autonomic influences on limbic activity”. (Jan., 2006)

**Spelman College**, Atlanta, GA. Atlanta Univ. Consortium Annual Research Day. Strategies for Successful Entry Into Postgraduate Education, “thoughts from the other side”. (April 2006).

**St. Mary’s College of Maryland**, St. Mary's City, MD. Neuroscience Speaker Series: The consequences of emotional arousal on memory. (Feb., 2006).

**Universidad Nacional Autónoma de México**, Querétaro, Qro. México. Emotional Arousal and Enhanced Memory: Understanding the Interactions between peripheral autonomic processes and central limbic structures. Instituto de Neurobiología. (Sept 24, 2004)

**Emory University**, Center for Behavioral Neuroscience. From the Periphery to the Brain; Identifying the Missing Link in the Modulation of Memory Storage. (Jan 2004).

**Ohio State University**, Dept. of Psychology. Noradrenergic modulation of memory is influenced by ascending input from brainstem structures. (May 2001).

**University of Texas at San Antonio**, Center for Neural Science. Contributions of the periphery and brain in mediating the beneficial effects of emotional arousal on memory storage. (March 2001).

**University of California**, Center for the Neurobiology of Learning and Memory. Four Decades of Memory: A Festschrift Honoring Dr. James L. McGaugh. (November, 1998). Brainstem Contributions to Memory Storage.

**Duke University**, Dept. of Psychology Colloquium Series (March, 1996)

Contribution of the NTS in Receiving, Relaying, and Regulating Processes Involved in Memory Formation.

**North Carolina A & T State University**, Dept. of Psychology Colloquium Series (April, 1996). The Role of Brainstem Nuclei in the Modulation of Memory Storage

**University of California at Santa-Cruz**, Biological Sciences Colloquium (February, 1993). Contribution of the Nucleus of the Solitary Tract in Mediating the Peripheral Effects of Hormones on Memory.

**Moderator**. Center for the Neurobiology of Learning and Memory Annual Spring Conference. University of California at Irvine. April, 1994.

**Invited Presenter**. Faculty Roundtable Discussion for the McNair/STAR Program (Scholastic Training and Academic Research), May, 1994.

**Moderator**. California Minority Graduate Education Forum (Discipline Workshop for the Life Sciences). University of California, San Diego. April, 1993.

#### **PREVIOUS UNIVERSITY SERVICE**

Graduate Faculty Council. (*Graduate Student Representative*, Southern Illinois Univ.) 1988-1990.

Graduate & Professional Student Council. (*Vice President*, Southern Illinois Univ.) Psychology Graduate Admissions Committee. (*Graduate Student Representative*, Southern Illinois Univ.) 1987-1989.

Black Psychology Graduate Student Association. (*President*, Southern Illinois Univ.) 1987-1989.

**Research Mentor**. University of California, Irvine. Summer Undergraduate Research Fellowship Program (SURF), 1993 and 1994.

**Research Mentor**. University of California, Irvine. PRIDE Research Fellows Program (Program Readiness in Research Development and Education), 1993.

**Research Mentor**. University of California, Irvine. NSF sponsored California Alliance for Minority Participation (CAMP), Summer 1993.