

## **CURRICULUM VITAE**

### **Paul J. Colombo**

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### **Education**

- 1996-1998 Postdoctoral Fellow. Michela Gallagher, P.I. Department of Psychological and Brain Sciences, Johns Hopkins University.
- 1994-1996 Postdoctoral Fellow. Michela Gallagher, P.I. Department of Psychology, University of North Carolina, Chapel Hill.
- 1988-1994 Ph.D. Predoctoral Fellow. Mark R. Rosenzweig, P.I. Department of Psychology, University of California, Berkeley.
- 1986-1988 M.A. Physiological Psychology, University of Colorado, Colorado Springs.
- 1981-1983 B.A. Psychology, University of Colorado, Colorado Springs.

### **Academic Appointments**

- 2019-Present Louise and Leonard Riggio Professor in Social Entrepreneurship
- 2004-Present Associate Professor. Department of Psychology, Program in Neuroscience, and Program in Aging Studies, Tulane University.
- 1998-2004 Assistant Professor. Department of Psychology and Program in Neuroscience, Tulane University.

### **Publications**

- Winston, J.L., Jazwinski, B.M., Corey, D.M., & Colombo, P.J. (2021). Music training, and the ability of musicians to harmonize, are associated with enhanced planning and problem-solving. *Frontiers in Psychology* DOI: 10.3389/fpsyg.2021.805186.
- Yurgil, K. A., Velasquez, M. A., Winston, J. L., Reichman, N. B., & Colombo, P. J. (2020). Music Training, Working Memory, and Neural Oscillations: A Review. *Frontiers in Psychology*, 11(February), 1–17. <https://doi.org/10.3389/fpsyg.2020.00266>
- Colombo, P. J., Habibi, A., & Alain, C. (2020). Editorial: Music Training, Neural Plasticity, and Executive Function. *Frontiers in Integrative Neuroscience*, 14(August), 1–3. <https://doi.org/10.3389/fnint.2020.00041>
- Pahng, A.R., & Colombo, P.J. (2017) Phosphorylation of tyrosine receptor kinase B in the dorsal striatum is associated with response learning, and may be a mechanism for interactions between neural systems specialized for memory. *Behavioural Neuroscience* Feb;131(1):33-41.
- Yang, H., Hou, H., Pahng, A., Gu, H. Nairn, A. Tang, Y.P., Colombo, P.J., & Xia, H. (2015) Protein phosphatase-1 inhibitor-2 is a novel memory suppressor. *Journal of Neuroscience*. Nov 11;35(45):15082-7.

## Publications (continued)

- Colombo, P.J. & Bohbot V. (2013). Dynamic interactions between memory systems. Hippocampus, 23: 971-972.
- Kathirvelu B, Colombo P.J. (2013). Effects of lentivirus-mediated CREB expression in the dorsolateral striatum: Memory enhancement and evidence for competitive and cooperative interactions with the hippocampus. Hippocampus, 23; 1066-1074.
- Kathirvelu, B., East, B.S., Hill, A.R., Smith, C.A., Colombo, P.J. (2013). Lentivirus-mediated chronic expression of dominant-negative CREB in the dorsal hippocampus impairs memory for contextual fear conditioning and place learning. Neurobiology of Learning and Memory, 99 10-16.
- Colombo, P.J. East, B.S. Jr., Crawley, M. E. & Hill, A.R. (2012). Aging and the Brain. In V.S. Ramachandran (Ed.) Encyclopedia of Human Behavior, 2nd Ed, London: Elsevier.
- Smith, C.A., East, B.S., & Colombo, P.J. (2010). The orbitofrontal cortex is not necessary for acquisition or remote recall of socially transmitted food preferences Behavioural Brain Research, 208 243–249.
- Brightwell, J.J., Smith, C.A., Neve, R.L., & Colombo, P.J. (2008). Transfection of mutant CREB in the striatum, but not the hippocampus, impairs long-term memory for response learning. Neurobiology of Learning and Memory, 89 27-35.
- Smith, C.A., Countryman, R.A, Sahuque, L.L., & Colombo, P.J. (2007). Timecourses of Fos expression in rat hippocampus and neocortex following acquisition and recall of a socially transmitted food preference. Neurobiology of Learning and Memory, 88, 65-74.
- Brightwell-Petta, J., Smith, C.A., Neve, R.L., & Colombo, P.J. (2007). Long-term memory for place-learning is facilitated by expression of cAMP response element-binding protein in the dorsal hippocampus. Learning and Memory, 14, 195-199.
- Arumugam, H., Liu, X., Colombo, P.J., Corriveau, R.A., & Belousov, A.B. (2005). NMDA receptors regulate developmental gap junction uncoupling via CREB signaling. Nature Neuroscience, 8 (12), 1720-1726.
- Countryman, R.A., Kaban, N.L. & Colombo, P.J. (2005). Hippocampal c-fos is necessary for long-term memory of a socially transmitted food preference. Neurobiology of Learning and Memory, 84, 175-183.
- Brightwell, J.J, Smith, C.A., Countryman, R.A, Neve, R.L. & Colombo, P.J. (2005). Hippocampal overexpression of mutant CREB blocks long-term but not short-term memory for a socially transmitted food preference. Learning and Memory, 12, 12-17.
- Countryman, R.A., Orlowski, J.D., Brightwell, J.J., Oskowitz, A.Z. & Colombo, P.J. (2005). CREB phosphorylation and c-Fos expression in the hippocampus of rats during acquisition and recall of a socially transmitted food preference. Hippocampus, 15:1, 56-67.
- Colombo, P.J. & Gold, P.E. (2004). Multiple memory systems. Neurobiology of Learning and Memory, 82, 169-170.
- Colombo, P.J. (2004). Learning-induced activation of transcription factors among multiple memory systems. Neurobiology of Learning and Memory, 82, 268-277.
- Brightwell, J.J., Gallagher, M. & Colombo, P.J. (2004). Hippocampal CREB1 protein, but not CREB2, is decreased in aged rats with spatial memory impairments. Neurobiology of Learning and Memory, 81, 19-26.

## Publications (continued)

- Colombo, P.J., Brightwell, J.J., & Countryman, R.A. (2003). Cognitive strategy-specific increases in phosphorylated CREB and c-Fos in the hippocampus and dorsal striatum. Journal of Neuroscience, 23, 3547-3554.
- Colombo, P.J., & Gallagher, M. (2002). Individual differences in spatial memory among aged rats are related to protein kinase C immunoreactivity in CA1 of hippocampus. Hippocampus, 12, 285-289.
- Nicolle, M.J., Colombo, P.J., Gallagher, M., & McKinney, M. (1999). Metabotropic glutamate receptor-mediated phosphoinositide turnover is blunted in spatial learning-impaired aged rats. Journal of Neuroscience, 19, 9604-9610.
- Colombo, P.J. & Gallagher, M. (1998). Individual differences in spatial memory and striatal ChAT activity among young and aged rats. Neurobiology of Learning and Memory, 70, 314-327.
- Colombo, P.J., Wetsel, W.C., & Gallagher, M. (1997). Spatial memory is related to hippocampal subcellular concentrations of calcium-dependent protein kinase C isoforms in young and aged rats. Proceedings of the National Academy of Sciences, USA, 94, 14195-14199.
- Colombo, P.J. (1997). Promises and Challenges of Brain Repair. Contemporary Psychology, 42, 513.
- Colombo, P.J., Rivera, D.T., Martinez Jr., J.L., Bennett, E.L., & Rosenzweig, M.R. (1997). Evidence for localized and discrete roles for enkephalins during memory formation in the chick. Behavioral Neuroscience, 111, 114-122.
- Colombo, P.J. (1996). Filling in a niche among animal learning textbooks. Contemporary Psychology, 41, 891-892.
- Gallagher, M., & Colombo, P.J. (1995). Ageing: The cholinergic hypothesis of cognitive decline. Current Opinion in Neurobiology, 5, 161-168.
- Colombo, P.J., Rivera, D.T., Martinez, J. L., Bennett, E.L. (1994). Neurochemical and pharmacological examination of the involvement of Met-enkephalin in memory for avoidance training in two regions of the chick brain. NIDA Research Monographs, Vol 141, 266.
- Colombo, P.J., Thompson, K.R., Martinez Jr., J.L., Bennett, E.L., & Rosenzweig, M.R. (1993). Dynorphin(1-13) impairs memory formation for aversive and appetitive learning in chicks. Peptides, 14, 1165-1170.
- Rosenzweig, M.R., Bennett, E.L., Colombo, P.J., Lee, D.W., & Serrano, P.A. (1993). Short-term, intermediate-term, and long-term memories. Behavioural Brain Research, 57, 193-198.
- Brooks, S.A., Colombo, P.J., Derrick, B.E., Gladden, V.L., Hernandez, R.V., Janak, P.H., Rodriguez, W.A., Rule, R.R. (1993). From Behavior to Brain: How Behavior Guides Reductionistic Analysis. Contemporary Psychology, 38. (11), 1183-1185.
- Colombo, P.J., Thompson, K.R., Martinez Jr., J.L., Bennett, E.L., & Rosenzweig, M.R. (1993). Opioid peptide administration and memory formation: effects of administration vehicle. Proceedings of the Western Pharmacology Society, 36, 239-244.
- Colombo, P.J., Martinez Jr., J.L., Bennett, E.L., & Rosenzweig, M.R. (1992). Kappa opioid receptor activity modulates memory for peck-avoidance training in the 2-day-old chick. Psychopharmacology, 108, 235-240.

## **Publications (continued)**

- Rosenzweig, M.R., Bennett, E.L., Martinez Jr., J.L., Beniston, D., Colombo, P.J., Lee, D.W., Patterson, T.A., Schulteis, G., & Serrano, P.A. (1991). Stages of memory formation in the chick: findings and problems. In R. Andrew (Ed.) *Neural and Behavioral Plasticity in the Domestic Chick*. Oxford: Oxford University Press.
- Davis, H.P., Cohen, A., Gandy, M., Colombo, P.J., VanDusseldorp, G., Simolke, N., & Romano, J. (1990). Lexical priming deficits as a function of age. *Behavioral Neuroscience*, 104, 286-295.
- Colombo, P.J., Davis, H.P., & Volpe, B.T. (1989). Allocentric spatial and tactile memory impairments in rats with dorsal caudate lesions are affected by preoperative behavioral training. *Behavioral Neuroscience*, 103, 1242-1250.
- Volpe, B.T., Davis, H.P., & Colombo, P.J. (1989). Preoperative training modifies radial maze performance in rats with ischemic hippocampal injury. *Stroke*, 20, 1700-1706.
- Colombo, P.J., Davis, H.P., Simolke, N., Markley, F., & Volpe, B.T. (1988). Forebrain ischemia produces hippocampal damage and a persistent working memory deficit in rats. *Bulletin of the Psychonomic Society*, 26 (4), 375-377.

## **Extramural Funding**

- "Mechanisms of Interactions among Memory Systems of the Mammalian Brain"  
National Science Foundation, 0849800; Role; PI; 5/1/09-4/30/13. \$300,000.
- "CAREER: Roles of hippocampal/neostriatal systems in multiple forms of memory"  
National Science Foundation, 01333734; Role: PI; 3/02-2/08. \$560,095
- "Role of Protein Kinases in Memory and Aging"; Louisiana Board of Regents, Research Competitiveness Subprogram, 540578; Role: PI; 6/00-5/02. \$82,783

## **Intramural Funding**

- Louise and Leonard Riggio Professor in Social Entrepreneurship; Annual endowment payout.
- Tulane University Carol Lavin-Bernick Faculty Research Grant. Colombo (PI) Effects of Music-based Mentoring on Cognitive and Emotional Development in Children. 8/1/2016. \$7000.
- Tulane University Center for Public Service, Community-Based Research Program, Colombo (PI) Effects of Music-based Mentoring on Cognitive and Emotional Development in Children. 10/2015. \$4500.
- Tulane University Center for Public Service, Public Service Upper Level Course Development Grant. Role PI, 03/2015. \$5000.
- Tulane University Program for Research Support. Role: PI, 05/01/2013-04/30/2016. \$30,000.
- "Academic Enhancement and Evaluation of the Roots of Music Program" Newcomb-Tulane College, Dean's fund. Role: PI, 1/1/2010-5/1/2013 \$14,800.
- "Transcriptional regulation in memory and aging" Tulane Research Enhancement Fund, Role: PI, 3/1/08-2/28/10. \$60,000.

### **Professional Activities and Service**

- 2018-19 Guest Editor, *Frontiers in Auditory Cognitive Neuroscience*; Special Research Topic “Music Training, Neural Plasticity, and Executive Function. 17 articles, >170,000 views.
- 2014 Program Chair, American Psychological Association, Div. 6, Behavioral Neuroscience and Comparative Psychology
- 2013 Co-editor, Special issue, *Hippocampus*; “Dynamic interactions between memory systems”, Volume 23, Number 11, 2013.
- 2012 Co-organizer, satellite symposium titled “Dynamic Interactions between Memory Systems”, Society for Neuroscience, 2012.
- 1994- Pres. Member, Association for Psychological Science
- 1994- Pres. Member, American Psychological Association
- 1988- Pres. Member, Society for Neuroscience

### **Fellowships and Awards**

- 2019 Fellow: Carnegie Corporation of New York
- 2015 Fellow; American Psychological Association, Division 6, Society for Behavioral Neuroscience and Comparative Psychology
- 2001 Excellence in Non-Tenured Teaching Award; Newcomb Alumnae Association
- 1994-1998 NIMH; NRSA Postdoctoral Fellowship.
- 1991-1994 NIDA; NRSA Predoctoral Fellowship.
- 1989-1991 NIMH; Graduate Trainee in Cognitive and Biological Psychology.

### **Ad-Hoc reviewer for the following peer-reviewed journals**

Behavioral Brain Research, Behavioral Neuroscience, Biochemistry and Behavior, Brain Research, European Journal of Pharmacology, Frontiers in Aging Neuroscience, Frontiers in Integrative Neuroscience, Hippocampus, Journal of Neuroscience, Learning and Memory, Neurobiology of Aging, Neurobiology of Learning and Memory, Neuroscience, Neuroscience Letters, Neuropsychopharmacology, Peptides, Psychopharmacology

### **Review Editor**

2010-Present Frontiers in Integrative Neuroscience

### **Invited Presentations (2011-Present)**

- American Psychological Association, 124<sup>nd</sup> Annual Convention, Denver, CO 8/6/16.
- University of Colorado, Colorado Springs, Department of Psychology, 4/15/15.
- American Psychological Association, 122<sup>nd</sup> Annual Convention, Wash., D.C. 8/7/14.
- University of Texas, San Antonio, Department of Biology, 2/20/14.
- Louisiana State University, Department of Anatomy, 12/2/13.
- Society for Neuroscience, Satellite Symposium, New Orleans, LA., 10/12/12.
- Southern Society for Philosophy and Psychology, New Orleans, LA, 3/12/11.

### **Published Abstracts and other Conference Presentations (2011-Present)**

Velasquez, M.A., Yurgil, K.A., Domenech, L., Pearson, C., Winston, J.L., & Colombo, P.J. Rhythmic priming results in neural entrainment and persistent effects on sensorimotor synchronization. Society for Neuroscience Abstracts. 47.

Winston, J.L., Velasquez, M.A., Cavalli, A., Raturi, V., & Colombo, P.J. (2020). Community music programming enhances executive functions and self-efficacy in school-aged children. Neuromusic VII abstracts.

Colombo, P.J., Winston, J.L., Jazwinski, B.M., & Corey, D. (2020). Music training is associated with enhanced executive functions: harmonic ability as a potential mechanism. Neuromusic VII abstracts.

Velasquez, M.A., Buck, S.A., Winston, J.L., Reichman, N.B., & Colombo, P.J., (2020). Effect of musical experience on cortisol and interleukin-6 response to acute psychological stress. Neuromusic VII abstracts.

Winston, J.L., Reichman, N.B., Reigel, D. & Colombo, P.J. (2018). Music training is associated with enhanced executive functions: Harmonic ability as a potential mechanism. Association for Psychological Science Abstracts.

Jones, A.F., Leach, A.C., Gaviria, M. & Colombo, P.J. (2015). NFκBp65 in the dorsomedial striatum is associated with spatial memory formation across the lifespan. Gerontological Society of America Abstracts. 68.

Jones, A.F., Pilgeram, N.R. & Colombo, P.J. (2015). Increased basal levels of NFκBp65 in the nucleus of hippocampal cells is related to maintenance of hippocampus-dependent spatial memory in aged rats. Society for Neuroscience Abstracts. 41.

Colombo, Paul J. (2014). Memory enhancement, CREB, and interactions between the hippocampus and striatum. American Psychological Association, Convention Abstracts.

East, B.E., Jr, Crawley, M.E., Hill, A.R., Winsauer, P.J., & Colombo, P.J. (2012). The rodent Simon Task as a tool for investigating cognitive control and conflict adaptation. Society for Neuroscience Abstracts 38.

Hill, A.R., Britton, R., Zambratto, J. Charles, D., & Colombo, P.J. (2012). Individual differences in phosphorylated tyrosine kinase b levels in the dorsal striatum and dorsal hippocampus are positively correlated with the duration of training on a response task: Evidence for a competitive interaction between the striatum and the hippocampus. Society for Neuroscience Abstracts 38.

Crawley, M.E., Kathirvelu, B. & Colombo, P.J. (2011). Learning-induced increases in histone acetylation after reinforcement of place and response strategies. Society for Neuroscience Abstracts 37.

East, B.S. Jr., Kathirvelu, B., Kochli, D.E., & Colombo, P.J. (2011). Wasted on the young: overexpression of CREB in the hippocampus improves spatial memory in young, but not middle-aged, rats Society for Neuroscience Abstracts 37.

Kathirvelu, B., Kochli, D.E., Hill, G.S., & Colombo, P.J. (2011) Lentivirus overexpression of CREB in the dorsolateral striatum facilitates long-term memory for cue learning and contextual fear conditioning: Evidence for a cooperative interaction between the striatum and the hippocampus. Society for Neuroscience Abstracts 37.

## **Ph.D. Students Mentored**

**Current:** Dehan Elcin, Department of Psychology, entered September, 2021  
Miguel Velasquez, Department of Psychology, entered September, 2018

**Past:** Jenna Winston, Ph.D. awarded September, 2021  
Maxwell Anderson, Ph.D. awarded September, 2018  
Brett East, Ph.D. awarded September, 2016  
Andrea Jones, Ph.D. awarded August, 2016  
Amanda Pahng, Ph.D. awarded October, 2015  
Balachandar Kathirvelu, Ph.D. awarded May, 2013  
Clayton Smith, Ph.D. awarded May, 2010  
Jennifer Brightwell, Ph.D. awarded May, 2005  
Renee Countryman, Ph.D. awarded December, 2004

## **Courses Taught**

**Graduate:** Psyc/Nsci 6510 Biological Psychology  
Psyc 6180 History and Systems of Psychology

**Undergraduate:** COLQ 2050; Grant writing for non-profit organizations  
Psyc/Nsci 3300; Brain and Behavior  
Psyc 4180 History and Systems of Psychology  
Psyc/Nsci 4510; Biological Psychology  
Psyc/Nsci 4513; Music and Brain

## **Institutional Activities and Service**

### **Current**

2021 – Present Undergraduate Research Skills Curriculum Committee  
2017 – Present University Committee on Undergraduate Academic Advising  
2017 – Present Advisor, NAE Grand Challenge Scholars Program  
2015 – Present Tulane University Honor Board  
2009 – Present Faculty advisor, Academic tutoring; The Roots of Music.

### **Past**

2019 – 2021 Faculty mentor, Mellon Graduate Program in Community-Engaged Scholarship  
2009 – 2016 Steering Committee, Graduate Program in Aging Studies, Tulane University  
2012 – 2015 Undergraduate Curriculum Committee, School of Science and Engineering, Tulane University  
2011 - 2014 Professor in Residence, Weatherhead Residential College, Tulane University.  
2010 - 2012 University Senate, School of Science and Engineering, Tulane University.  
2009 - 2011 Professor in Residence, Wall Residential College, Tulane University.  
2004 – 2009 Institutional Animal Care and Use Committee, Tulane University  
2003 - 2009 Steering Committee, Graduate Program in Neuroscience, Tulane University  
2001- 2002 Co-Director, Graduate Program in Molecular and Cellular Biology, Tulane University