

**William Christopher (Chris) Risher, PhD**  
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## EDUCATION

Ph.D. Medical College of Georgia, Augusta, Georgia (Neuroscience) 2010  
B.S. Clemson University, Clemson, South Carolina (Biological Sciences, General Honors) 2003

## RESEARCH EXPERIENCE

### Marshall University

Assistant Professor, Biomedical Sciences 2018-Present

### Duke University

Postdoctoral Associate, Dr. Cagla Eroglu, Cell Biology/Neurobiology 2011-2018

### Medical College of Georgia (Now Augusta University)

Graduate Research Assistant, Dr. Sergei Kirov, Brain and Behavior Discovery Institute 2006-2010

Graduate Research Assistant, Dr. Kristen Harris, Synapses and Cognitive Neuroscience Center 2004-2006

## GRANTS AWARDED

*Brain & Behavior Research Foundation NARSAD Young Investigator Award 27662* 01/15/19-01/14/21

Title: Astrocytic regulation of synaptic connectivity in neonatal abstinence syndrome

This project was designed to understand the mechanisms underlying disrupted brain connectivity in a rodent model of neonatal abstinence syndrome (NAS), a state of withdrawal in infants born to mothers who abused opioids during pregnancy. The project was recently funded by the John and Polly Sparks Foundation through the BBRF's Research Partners Program.

Role: PI

*NIH/NINDS F32 NS083283* 07/01/13-07/01/15

Title: Control of excitatory synapse formation and maturation by astrocytes

This project was designed to investigate the roles of the astrocyte-secreted proteins thrombospondin, hevin and SPARC in synapse formation and development.

Role: PI (Sponsor: Cagla Eroglu, Co-Sponsors: Vann Bennett, Nicole Calakos)

*NIH T32 NS511566* 02/04/11-02/03/12

Title: Investigation of the functional role of astrocyte-mediated synaptogenesis in vivo

This project was designed to investigate the role of the thrombospondin receptor, alpha-2-delta-1, in developmental and injury-mediated synaptogenesis in vivo.

Role: Trainee (PI: Cagla Eroglu)

*NIH/NINDS F31 NS064753* 03/01/10-12/10/10

Title: Neuronal and astroglial injury and recovery from stroke-induced depolarizations

The goal of this project was to use real-time in vivo 2-photon microscopy to understand the mechanism of cellular injury and recovery in the wake of ischemic depolarizations in mouse models of stroke.

Role: Trainee (PI: Sergei Kirov)

## AWARDS/HONORS

### Marshall University

John and Polly Sparks Foundation Investigator 2019

Society for Neuroscience Annual Meeting, "Hot Topic" Poster Presentation (Taylor Boggess, student) 2019

*(Only ~100 out of more than 14,000 submitted abstracts chosen for this recognition)*

Brain & Behavior Research Foundation NARSAD Young Investigator Grant 2018

### Duke University

Best Postdoc Poster (Runner-up), Neuroimmunology & Glia Group Spring Symposium, Chapel Hill, NC 2017

Best Postdoc Poster, Neuroimmunology and Glia Group Spring Symposium, Chapel Hill, NC	2016
Best Postdoc Talk, Cell Biology Retreat, Beaufort, NC	2014
Best Postdoc Talk, Neurobiology Retreat, Wilmington, NC	2013
International Journal of Biochemistry and Cell Biology Poster Prize, FASEB Science Research Conference on Matricellular Proteins in Development, Health & Disease, Saxtons River, VT	2013
Best Postdoc Poster, Neurobiology Retreat, Wilmington, NC	2012
Honorable Mention, Best Postdoc Poster, Cell Biology Retreat, Wilmington, NC	2012

### Medical College of Georgia

Award of Excellence in Research, Graduate Research Day	2009
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### Clemson University

Magna cum Laude, General Honors	2003
National Society of Collegiate Scholars	2001-2003
Golden Key National Honor Society	2002-2003
Abney Foundation Scholar	1999-2003
Palmetto Fellows Scholar	1999-2003

### PEER-REVIEWED PUBLICATIONS

<https://www.ncbi.nlm.nih.gov/pubmed?cmd=search&term=risher+wc>

Walker CD, **Risher WC**, Risher ML. 2020. Regulation of synaptic development by astrocyte signaling factors and their emerging roles in substance abuse. *Cells* 9(2): E297. PMID: 31991879

**Risher WC**, Kim N, Koh S, Choi JE, Mitev PR, Spence EF, Pilaz LJ, Wang D, Feng G, Silver DL, Soderling SH, Yin HH, Eroglu C. 2018. Thrombospondin receptor alpha-2-delta-1 promotes synaptogenesis and spinogenesis via postsynaptic Rac1. *J Cell Bio* 217(10): 3747-65. PMID: PMC6168259

Risher ML, Sexton HG, **Risher WC**, Wilson WA, Fleming RL, Madison RD, Moore SD, Eroglu C, Swartzwelder HS. 2015. Adolescent Intermittent Alcohol Exposure: Dysregulation of Thrombospondins and Synapse Formation are Associated with Decreased Neuronal Density in the Adult Hippocampus. *Alcohol Clin Exp Res* 39(12): 2403-13. PMID: PMC4712076

Risher ML, Fleming RL, **Risher WC**, Miller KM, Klein RC, Wills T, Acheson SK, Moore SD, Wilson WA, Eroglu C, Swartzwelder HS. 2015. Adolescent intermittent alcohol exposure: Persistence of a structural and functional hippocampal abnormalities into adulthood. *Alcohol Clin Exp Res* 39(6): 989-97. PMID: PMC4452443

**Risher WC**, Patel S, Kim IH, Uezu A, Bhagat S, Wilton DK, Pilaz LJ, Singh Alvarado J, Calhan OY, Silver DL, Stevens B, Calakos N, Soderling S, Eroglu C. 2014. Astrocytes refine cortical connectivity at dendritic spines. *eLife* 3:e04047. PMID: PMC4286724.

**Risher WC**, Ustunkaya T, Singh Alvarado J, Eroglu C. 2014. Rapid Golgi analysis method for efficient and unbiased classification of dendritic spines. *PLOS ONE* 9(9):e107591. PMID: PMC4160288.

McKinstry SU, Karadeniz YB, Worthington AK, Hayrapetyan VY, Ozlu MI, Serafin-Molina K, **Risher WC**, Ustunkaya T, Dragatsis I, Zeitlin S, Yin HH, Eroglu C. 2014. Huntingtin is required for normal excitatory synapse development in cortical and striatal circuits. *J. Neurosci* 34(28): 9455-72. PMID: PMC4087216.

**Risher WC**, Croom D, Kirov SA. 2012. Persistent astroglial swelling accompanies rapid reversible dendritic injury during stroke-induced spreading depolarizations. *Glia* 60(11): 1709-20. PMID: PMC3435464.

**Risher WC**, Eroglu C. 2012. Thrombospondins as key regulators of synaptogenesis in the central nervous system. *Matrix Biology* 31(3): 170-7. PMID: PMC3961754.

**Risher WC**, Lee MR, Hess DC, Kirov SA. 2011. Dibucaine mitigates spreading depolarization in human neocortical slices and prevents acute dendritic injury in the ischemic rodent neocortex. *PLOS ONE* 6(7): e22351. PMID: PMC3137632.

**Risher WC**, Ard D, Yuan J, Kirov SA. 2010. Recurrent spontaneous spreading depolarizations facilitate acute dendritic injury in the ischemic penumbra. *J. Neurosci* 30(29): 9859-68. PMID: PMC2918261.

**Risher WC**, Andrew RD, Kirov SA. 2009. Real-time passive volume responses of astrocytes to acute osmotic and ischemic stress in cortical slices and in vivo revealed by two-photon microscopy. *Glia* 57(2): 207-21. PMID: PMC2635108.

## INVITED TALKS

“Investigating the effects of early-life opioid exposure on brain connectivity.” WVa Recovers: An Integrated Approach to Substance Use Disorder Recovery, West Virginia Wesleyan College, Buckhannon, WV. September 2019.

“Control of synaptic connectivity by astrocytes.” XIII European Meeting on Glial Cells in Health and Disease, Edinburgh, Scotland. July 2017.

“The unsung ‘stars’ of the brain: How do astrocytes control cortical development?” Albany Medical College, Albany, NY. April 2017.

“How do astrocyte-secreted thrombospondins and neuronal receptor  $\alpha 2\delta$ -1 shape cortical connectivity?” 5<sup>th</sup> International Glial Biology Conference, Virginia Tech Carilion Research Institute, Roanoke, VA. October 2016.

“Elucidating the roles of astrocyte-secreted thrombospondin and neuronal receptor  $\alpha 2\delta$ -1 in shaping brain connectivity.” FASEB Matricellular Proteins in Development, Health, and Disease, West Palm Beach, FL. July 2016.

## TEACHING EXPERIENCE

### Marshall University

MSI Structure & Function II Neuroanatomy for first-year medical students in the Joan C. Edwards School of Medicine (Spring 2019-Current)

### Duke University

Participated in the Neurobiology of Disease Course (Jan-Feb 2012) in which I gave a lecture and led class discussion on the topic of addiction with graduate students and postdocs; Taught a class on brain morphogenesis for the Program of Cell and Molecular Biology (Sept 2015)

### Medical College of Georgia

Assisted in the organization of lecture materials for Dr. Kirov; Led discussion once per semester in the Synapse Journal Club, presenting recently published papers to fellow graduate students, postdocs and faculty

## MENTORING EXPERIENCE

### Marshall University

*Taylor Boggess* (MD/PhD Rotation Student), *Shanai Brown* (Graduate Rotation Student), *Cecilia Sierra* (PhD Rotation Student), *Jesse Stevens* (Research Volunteer), *Ean Bills* (Undergraduate), *Ethan Niebergall* (Undergraduate)

### Duke University

*Andrew Williams* (Undergraduate), *Valerie Tornini* (PhD Rotation Student), *Haining Yang* (Undergraduate), *Sagar Patel* (Undergraduate), *Jonnathan Singh Alvarado* (Research Volunteer), *Brittney Coleman* (Undergraduate, Summer Research Opportunity Program), *Timothy Nyangacha* (Undergraduate), *Ji-Eun Choi* (Undergraduate), *Petar Mitev* (PhD Rotation Student)

## **Medical College of Georgia**

*Jeremy Sword* (PhD Graduate Student), *Joshua Farrow* (PhD Rotation Student)

### **COMMUNITY ACTIVITIES**

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| Marshall Brain Expo, Huntington, WV  | 2019 |
| - Supervised undergraduates presenting neuroscience-related exhibits to local elementary school students as part of Brain Awareness Week |      |
| KaBOOM! Oakwood Park Playground, Durham, NC  | 2013 |
| - Participated in building a new playground for a local Durham community   |      |
| Brain Awareness Week, Museum of Life and Science, Durham, NC   | 2013 |
| - Presented neuroscience demonstrations to visitors of all ages  |      |
| Brain Awareness Week, Fort Discovery, Augusta, GA  | 2009 |
| - Assisted other graduate students in presenting basic neuroscience facts to high school students  |      |
| Brain Awareness Week, AR Johnson High School, Augusta, GA  | 2006 |
| - Demonstration of various optical illusions for students at a magnet high school  |      |

### **PEER REVIEWER**

*Annals of Biomedical Engineering*

*eLife*

*Glia*

*PLoS ONE*

*Progress in Neuropsychopharmacology & Biological Psychiatry*