NC STATE UNIVERSITY

Comparative Medicine Institute

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Genes, Circuits, and Behavior

Research emphasis:

The overarching goal of the Marsden lab is to better understand the processes underlying neurological disease by uncovering how genetics and environment shape neural circuit mechanisms that drive behavior and behavioral dysfunction. Using zebrafish as our model system, we take a multifaceted experimental approach, including gene expression analysis, high-throughput behavioral testing, 3- and 4-D analysis of neural circuits, simultaneous imaging of neuronal activity and behavior, and optogenetic techniques.

Application:

- Zebrafish models
- Behavior analysis
- Confocal microscopy
- Optogenetics

Collaboration potential:

- Zebrafish disease models
- *In vivo* genetic and/or chemical screening
- Whole-brain activity mapping

Selected publications:

Marsden KC, Jain RA, Wolman MA, Echeverry FA, Nelson JC, Hayer KE, Miltenberg B, Pereda AE, Granato M. A Cyfip2-Dependent Excitatory Interneuron Pathway Establishes the Innate Startle Threshold. ***Cell Rep***. 2018 Apr 17;23(3):878-887.

Marsden KC, Granato M. In Vivo Ca(2+) Imaging Reveals that Decreased Dendritic Excitability Drives Startle Habituation. ***Cell Rep***. 2015 Dec 1;13(9):1733-40.

Wolman MA, Jain RA, Marsden KC, Bell H, Skinner J, Hayer KE, Hogenesch JB, Granato M. A genome-wide screen identifies PAPP-AA-mediated IGFR signaling as a novel regulator of habituation learning. ***Neuron***. 2015 Mar 18;85(6):1200-11.

Marsden KC, Shemesh A, Bayer KU, Carroll RC. Selective translocation of Ca2+/calmodulin protein kinase IIalpha (CaMKIIalpha) to inhibitory synapses. ***Proc Natl Acad Sci U S A***. 2010 Nov 23;107(47):20559-64.