

Weekly Colloquium

Tuesday, 11/7/2017, 12:30pm, Billings Building – Rosedale Conference Room

“Cell Biology of Functional Axon Regeneration”

Marc Hammarlund, Ph.D.
Associate Professor of Genetics and Neuroscience
Director of Graduate Studies, Genetics
Yale University School of Medicine



My long-term goal is to understand how neurons and neuronal circuits generate and maintain normal function, to analyze how they regulate their response to injury, disease, and age, and to identify ways to control these processes at the molecular level. Of critical importance to this project, my research focuses on generating novel transgenic animals and analyzing neurons by fluorescent microscopy. We have developed new tools and approaches to studying individual neurons *in vivo*, including novel RNAi-based techniques, single-neuron laser surgery and optogenetics. These techniques include the genomic approaches of cell-specific CHIP-seq (Byrne et al. 2014), and cell-specific RNA-seq (Byrne et al. 2016). Because *C. elegans* is transparent and has a simple nervous system, we can manipulate and observe individual neurons in intact, living animals. Another major current focus in the lab is understanding the genetics and cell biology of axon regeneration. We have identified several novel regeneration pathways, and are working to link regeneration to functional recovery; to understand how age affects regenerative potential; and to use genetics and genomics to identify additional components of regeneration. A new project (CeNGEN) seeks to generate and analyze an ultra-high density map of neuronal gene expression.

Recent Publications:

Han, S.M., Baig, H. S., and Hammarlund, M. (2016). Mitochondria localize to injured axons to support regeneration. *Neuron* 92, 1308-1323.

Byrne, A. B., McWhirter, R. D., Sekine, Y., Strittmatter, S. M., Miller III, D. M., and Hammarlund, M. (2016). Inhibiting poly(ADP-ribosylation) improves axon regeneration. *eLife* 5: e12734. PMID: PMC5050021.

Kosmaczewski, S.G., Han, S.M., Han, B., Meyer, B., Baig, H.S., Athar, W., Lin_moore, A.T., Koelle, M.R., and Hammarlund, M. (2015). RNA ligation in neurons by RtcB inhibits axon regeneration. *PNAS* 11(27),8451-6.PMID: MC4500288.

