Neural circuits established in embryonic development are often modified to meet dynamic needs in adult life. In C. elegans, locomotor circuit undergoes a dramatic connectivity switch in larval development. Operation of the adult locomotor circuit also requires balanced excitation and inhibition. We have employed integrated approaches starting from forward genetic screening to dissect intricate interactions in synapse formation, remodeling and maintenance. Additionally, the ability of neurons to respond to injury is vital for protecting circuit’s function. We have established an in vivo axon injury model to discover conserved genes functioning in axon regeneration. In this talk I will cover these two topics in neural circuit refinement and maintenance.