Title: Neural circuit mechanisms for triggering and reversing aversive memories

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Abstract:
Aversive experiences produce powerful emotional memories and the strength of these memories is proportional to the intensity of the aversive experience. However, aversive memories need to be reduced or extinguished when they are no longer appropriate to enable adaptive functioning. My lab uses optogenetics and in-vivo physiology to understand how brain circuits give rise to neuronal coding and behavior. I will discuss studies in which we’ve used this approach to identify a feedback circuit which controls aversive prediction error coding and functions to set the strength of fear memories during learning. I will also show work in which we’ve discovered distinct noradrenaline cell populations within the locus coeruleus which engage either fear or extinction learning through precise anatomical targeting. Together, our work is beginning to reveal how distributed, opposing neural circuits interact to trigger aversive memories and control their strength or to reduce emotional responses and enable more flexible behavior.