**ABSTRACT:** Although anesthetic drugs are essential in medicine, they often have significant cardiopulmonary and neurologic side effects likely due to their non-specific neural circuit targeting. To better understand the brain’s arousal circuits, I will describe two approaches in characterizing these circuits with increased precision: 1) a projection-based approach using the noradrenergic circuit as an example, and 2) a molecular-based approach using the nociceptin opioid receptor as an example. By more precisely characterizing these arousal circuits, my long-term goal is to work towards rational neural circuit design to modulate arousal.

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