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# **How Massive Star FEEDBACK Carves Pillars out of Dense Gas**

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Massive stars, often born in rich stellar clusters, weather away their natal environments with intense FUV and EUV radiation and powerful stellar winds, thereby pumping vast amounts of radiative and mechanical energy into what had been a cold, dense, and relatively serene molecular cloud complex. The strong winds shock nearby gas into an X-ray emitting plasma, the harsh EUV radiation ionizes an H II region, and an energetic bubble is blown into the cloud complex with the cluster at its center. Such reckless acts do not go unnoticed; at the edges of these wind-blown bubbles, intriguing elongated structures are carved out from the dense molecular gas, pointing back towards the responsible cluster like accusing fingers. These “pillars”, with the iconic Pillars of Creation in M16 as their ambassador, are known to be indicators of massive star feedback on dense molecular gas, but the conditions and mechanisms of their formation are not well-studied.

In this poster, I present my ongoing study of the Pillars of Creation which I conduct as part of the FEEDBACK SOFIA C+ Legacy Project, whose goal is to better understand massive star feedback and its effect on the interstellar medium and to provide the community with valuable legacy data products. I also outline my thesis work, for which I propose to leverage the FEEDBACK Project’s spatially and spectrally resolved maps of the [CII] 158 micron and [OI] 63 micron cooling lines, obtained with the 14-pixel upGREAT receiver on SOFIA, for 11 Galactic H II regions, in order to glean kinematic and energetic information about a diverse sample of pillars and other types of similarly carved structures. With this sample, I will be able to explore variables such as cluster mass/age/energetics, location in the Galaxy, or initial cloud conditions, and study how the pillars respond. My goal in establishing these connections is to “read” pillars as signposts to better understand the conditions by which they were formed. Until then, they remain pointed fingers, only able to tell us “who” irradiated their molecular cloud, but not how, or why.