Frontera Fellowship Personal Statement: Sean Christian Lewis

I am proposing to be a Frontera Computational Science Fellow because I seek critical support for my research studying stellar feedback from embedded O-type stars and their effects on star cluster evolution. My research will use a novel software environment and the computation time awarded to Frontera fellows to run cutting-edge simulations. Additionally, my proactive mindset as a student body leader and drive to inspire future colleagues will be greatly developed by the opportunity to attend TACC and present my research at a community or professional conference.

At California Polytechnic State University: San Luis Obispo, my passionate pursuit of becoming an astrophysicist was first realized when I sought to join Dr. Vardha Bennert and her research on active galactic nuclei. In what became my senior thesis project, I explored the accuracy of fitting techniques for emission spectra of 80 local active galaxies. I became familiar with statistical methods using Python and personally attended an observing run at Lick Observatory on Mount Hamilton, California. My contributions also lead to my first co-authorship in Bennert et al. (2018). I supplemented my research position as the Treasurer of the physics honors society Sigma Pi Sigma. I graduated from Cal Poly in the summer of 2016 with honors.

I began my Ph.D. program in Physics at Drexel University in September 2017. In my first summer, I began research with Dr. Stephen McMillan. I utilized my skills in Python to design simulations exploring the survivability of globular clusters encountering supermassive binary black holes. I presented my work as a research poster at the 2019 AAS winter meeting. Then, wanting to further hone my skills as a computational astrophysicist, I shifted my focus to my thesis topic of star formation. The project utilizes a complex software suite that bridges magnetohydrodynamics and N-body physics and has required me to rapidly become familiar with Fortran90, C++ syntax, and HPC environments. The software suite, known as *Torch,* is also being used by several other collaborating graduate students outside of Drexel with whom I meet regularly. I am also currently the Treasurer and Event Coordinator of the Physics Graduate Student Association (PGSA) where I have allocated funds for, planned, and participated in public outreach programs such as Drexel Scholar Share, the annual Philadelphia Science Festival, and student community activities such as the PGSA camping trip and bimonthly PGSA student lectures.

Since completing my undergraduate degree, my personal and professional goal has always been to become an astrophysicist. In my eagerness to learn, share, lead, and inspire others, I have taken every opportunity to further myself as a scientist. I look forward to expanding my knowledge and utilization of HPC clusters with the computer time awarded by the Frontera Fellowship. I am excited to experience new perspectives, explore new problem-solving methods, and have the opportunity to share my own efforts in the TACC community.