Afterglowpy is an open-source code written in C and Python that computes synchrotron emission from the forward shock of a relativistic structured jet. By default, it does not calculate synchrotron self-compton (SSC) emission, synchrotron self-absorption, an external wind medium, or reverse shock emission, all of which are important for accurately modeling GRB physics. These features are especially necessary in cases of GRBs like the brightest-of-all-time GRB 221009A, which is insufficiently explained by simplified models. My project will continue the development of *afterglowpy* to include all relevant and recent developments in the field of GRB astrophysics and perform numerical calculations accurately and efficiently for use in Monte Carlo simulations and machine learning.

My career goals are multi-faceted. First, I aim to conduct novel and impactful scientific research in theoretical and computational high-energy astrophysics to advance the frontiers of knowledge and lay the foundation for future technologies and human expeditions. Second, I aim to engage with others at various scientific levels to inspire them and increase their understanding of the universe. Third, I aim to advance national science interests, catalyze economic growth through science, and reinforce the U.S.A. as the world's scientific leader in astrophysics. This fellowship program will allow me to further develop my skills in a professional scientific environment and conduct novel independent research. It will grant me an opportunity to collaborate with others in the program and organization with whom I plan to engage with long after this fellowship. Finally, it will help me improve in areas where I can be most impactful in a future career at NASA.