Northeastern University
College of Science

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Northeastern University
360 Huntington Avenue
Boston, MA 02115

Dear Application Committee for the Physics Research Co-op Fellowships,

I hope the following exposition finds you well and adequately details my proposed research project on the Point Spread Function (PSF).

The **objective** of this research is to come up with a mathematical model to describe the PSF. The PSF is a function that takes in some parameters and outputs a matrix. This matrix acts on point sources, essentially distorting images of star light. It would be my job to help in creating a software pipeline that runs a parameter estimation and creates diagnostic plots to see how well our model performed. We will start by running our model on simulated data where we can compare our model's behavior to the correct answer. Once our model is well calibrated we would like to then use the model on real data captured by the James Webb Space Telescope to create sharable measurements of the PSF. Data is coming in now and so we would be able to work on this from the getgo of the Co-op project. On a **day to day basis**, I would spend several hours of my time programming with Python, creating a file infrastructure with Linux, and making things accessible for a larger collaboration. Additionally, I aim to read papers in the literature and explore programming libraries pertinent to my research. This will help me build up enough familiarity in the field to embark on some longer term goals. We are currently using a library called PIFF to do our PSF modeling, and in doing so, we are using its functionality beyond its original purpose. As such, one of my **long term goals** is to write my own library to replace it, building off of my knowledge from literature review and advanced coursework.

Thank you for taking the time to read,

Eddie Berman

Edward Berman,
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