This week, I started work and so did not have as much time as I wanted to work on research; however, I had time to complete a little over half of the CS309 notes. I have some questions about how degenerate cores come about, the role that synchrotron radiation plays in star formation, and how primary distance indicators are initially calibrated (using fundamental methods?). I plan on rounding out my knowledge on these topics using the Coursera astronomical class, which I hope to start and make decent progress in during this coming week. In the week before last, we also read over Dr. Offner's paper and made notes on her approach–we're interested in exploring her use of simulated images in the training set, as well as her "confidence" gradient on classification of an image based on its position in the frame.

As for our research, we're working on incorporating the citizen science galaxy dataset (expanded Galaxy Zoo) that Dr. Offner mentioned. Our bounding box method will also be recalibrated, as the current training set consists of about 70% galaxy images, 30% (placeholder) star images. At the moment, our bounding box algorithm has about 63% accuracy on distinguishing entire (we tested accuracy by matching with the WISE Catalog, which uses bounding circles). We believe this accuracy will be improved when we fully complete our dataset augmentation.

Besides the logistics of moving and getting settled for work, some challenges were technical difficulties with the Python environment. My current workaround (virtual environment and early-version Python) requires regular restarts and reinstallations, but is sufficient for our work this week. However, it still makes progress time-consuming, and I'm hoping to fix it by experimenting with conda and mamba installations this coming week.

During this next week, we plan to complete our dataset modification to better match Dr. Offner's recommendations. We'll also use the notes we took on Dr. Offner's approach to ensure

our methodology is airtight, especially since she provided great insight on how our project would be dissected by reviewers. Finally, with Python envi issues fixed, we'll be able to make progress on retraining our segmentation (bounding box) neural net.