**Data base for confirmed/unconfirmed candidates**:[ExoFOP TIC (caltech.edu)](https://exofop.ipac.caltech.edu/tess/target.php?toi=1000.01)

Tutorials for lightkurve:[Tutorials — Lightkurve](https://docs.lightkurve.org/tutorials/index.html)

[Data Analysis Tools - TESS Science Support Center (nasa.gov)](https://heasarc.gsfc.nasa.gov/docs/tess/data-analysis-tools.html)

**For noise removal:**

* Decrowding: <https://heasarc.gsfc.nasa.gov/docs/tess/data-analysis-tools.html>

**For folding/phase:**

* Obtaining period [Microsoft Word - Chapter12.doc (aavso.org)](https://www.aavso.org/sites/default/files/Chapter12.pdf)

**For fitting:**

-This also optimises the parameters= <https://gallery.exoplanet.codes/tutorials/tess/>

[Data Analysis Tools - TESS Science Support Center (nasa.gov)](https://heasarc.gsfc.nasa.gov/docs/tess/data-analysis-tools.html) correcting the crowd to remove background noise and fit the curve

* Bayesian inference → analytical + numerical

**latte:**[Journal of Open Source Software: LATTE: Lightcurve Analysis Tool for Transiting](https://joss.theoj.org/papers/10.21105/joss.02101)

[Exoplanets (theoj.org)](https://joss.theoj.org/papers/10.21105/joss.02101)

**Solar oscillator/star analysis:**

<https://docs.lightkurve.org/tutorials/3-science-examples/asteroseismology-estimating-mass-and-radius.html#4.-Estimating-Stellar-Mass,-Radius,-and-Surface-Gravity>

Using mass to justify

**How to get uncertainties from corner plot?**

<https://stackoverflow.com/questions/47398380/is-there-a-way-to-write-the-errors-given-in-corner-plots>

**What we already did:**

* Looked at an unconfirmed candidate + clean up the data

**Goal:**

* Basically make a jupyter notebook with all the steps and noise removal and fitting so that you only have to change the variable name/event, etc
* Do it for like 20 cases?
* Obtain the corner plots of the key parameters for 20 cases + uncertainties

**To do**

* Remove different types of noises
* Do the fitting
* Figure out the error bars and uncertainties

**Reading to understand different sectors:**

<https://tess.mit.edu/observations/#:~:text=TESS%20observes%20the%20sky%20in,about%2027%20days%20on%20average>.

**The problem I just found:**

* The code at the moment (for TESS) is only looking at 1 transit → unconfirmed → is there even a way to stitch the data for TESS → confirm different sector data?

**William’s to do this weekend:**

Try the tutorial for decrowding and other types of noise removal methods

For fitting:

* Identify prior and posterior → might have to use published data on eccentricity
* Compare the minimising method vs the threshold method for aperture mask

Noise removal:

* Different methods of removal → use pixel level devolution/decorrelation = proven to work (used by exoplanet package + lightkurve). Other methods exist too though

Problems with fitting:

* The Angle attribute is no longer supported → just emailed the guy → **DONE**

Corner plot to get value + uncertainty:

* <https://pypi.org/project/corner/1.0.1/> → some pretty darn nice plots
* Use demo.py to get uncertainties <https://github.com/dfm/corner.py/blob/master/demo.py>

Divide these roles:

* Incorporate the solar oscillator + get uncertainties to be used as prior for the GP (Gaussian Process) model
* Aperture mask investigation (threshold vs minimising method)
* Corner plotting + uncertainties
* Decide on the 20 candidates (each person does how many???)
* Talk/discuss ideas with Rory
* Contact with the journal

Smaller stuff:

* Look up what planet b and planet c means (I keep seeing this in literature)
* Look up the different periods which we shouldn’t really gather data from (whether it’s like a thruster boost, etc)
* Decide on the criteria for our 20 candidates
* Understand the other columns' statistics (they are to do with the errors/mean of the Monte Carlo) . Read this <https://colab.research.google.com/github/bebi103b/bebi103b.github.io/blob/master/lessons/16/mcmc_diagnostics.ipynb>

Reading material:

* <https://arxiv.org/pdf/1809.05967.pdf>

**PAPERS ABOUT THE MODEL:**

Quadratic limb darkening law: This is the quadratic fit for the transit light curve (very popular) and also the fit we use in the code *Link*

Reparatermisation for the model: *https://arxiv.org/pdf/1308.0009.pdf*

*I think planets b and c refer to your parameter fits vs MAXIMUM posterior fits*