Getting Started with Reverse Engineering Blades with T-Blade3
(as of 4/24/2020)

Blade_comparison_openmdao.py:

1. Change paths for *foil1* (line 21) to the path to your target airfoil and *foil2* (line 60) to the path to the uv.blade output from T-Blade3.
2. *Line 14:* Setting *weight = 0* will run the non-weighted sum of least squares distance objective function so that each point on the airfoil has the same influence on the fit. Setting *weight = 1* will run the weighted sum of least squares distance objective function, giving more weight to the top and bottom sides of the airfoil during optimization.
3. *Lines 16-17:* Decide the cutoff points on the u-axis for the LE and TE. LE covers 0=<u<xLE, TE covers xTE=<u<1.
4. *Lines 77, 85, 112, and 121:* You may want to edit the cutoff value for v between the Top and Bottom surfaces to find a value or expression that works for your blades.
5. *Line 138:* Uncomment the plt.show() to get the comparison plots between the target airfoil and the respective points on the linear interpolation of the blade generated in T-Blade3 for the LE, TE, Top, and Bottom sections of the blades.
   Note: Leaving this command uncommented will result in the script pausing whenever the plot window pops up and resuming once it is closed. This is best saved for when checking the plots on the final iteration.
6. *Line 152:* Saves the comparison plot between the entire target blade and entire blade generated by T-Blade3 in the current working directory.

run_least_squares.sh:

1. Change path for *Line 8* to the path to your executable tblade3. Ensure that the dev command is present after tblade3.
2. Change path for *Line 11* to the path to your Blade_comparison_openmdao.py script.

Other Notes:

- The openMDAO optimizer may not always provide a perfect fit, so tightening the convergence tolerance and starting from where it left off is a good practice.
- If tightening the convergence tolerance doesn’t provide a satisfactory fit, change up the xLE and xTE parameters in the Blade_comparison script.