Motivation

* Quantitative analysis
  + Nucleation, volume fraction, variant selection
  + Important for
    - Modeling
      * Hardening behavior
      * Plastic anisotropy
* Twin code challenges
  + Quantitative twin analysis degrades with plastic strain
    - Slip induced texture change (show largely misoriented grain with a twin in it).
    - When the grain is 100% twinned it can’t find a twin relationship with parent
    - In constructing twin-parent relationships -i.e. building a family tree (funny picture)- lots of things can go wrong…
    - Codes that have been used for quantitative analysis haven’t made it to the community and can’t be developed by the community.
* To address these challenges we have started developing a code built on top of mtex. I’ll briefly present the code and talk about the general approach and the additions made to the two published twin analysis codes that have been published previously. Then I’ll spend the rest of my time talking about WE43 Mg alloy and its
  + Graph methodology
  + Misorientation definition – 5 degree boundary misorientation, larger like 10-12 degree mean orientation tolerance.
    - Twin frame for misorientation
  + Voting scheme
  + Matrix representation of twin parent relationships.
    - Complicated
      * Case1-Case3 showing how things need to be differientiated. Use twin matrix with colors for families
* Joke: There is a good chance you’ll fail your calculus exam if you are sitting between identical twins… because it is hard to differentiate them
* Input output figure??
* Twin stats to produce for WE43. Tension/compression and discussion
  + Two different types of plates?
  + Table of states
* Show Taylor cylinder data PFs and evolution of twinning at very high strain rate.
* Figure list:
  + Comparison of Zr, Mg, Ti, and WE43 from Laurent’s paper
* To do:
  + Check that the code can be saved and queried
    - Save grains, ebsd, G\_Complete.
    - For renaming variables see <https://www.mathworks.com/matlabcentral/answers/54969-best-way-to-rename-a-loaded-variable>
  + Make sure the count statistics work and the reconstruction is moved early in the routine.