What is expected from this report:

1. to help you focus on the goals of your project and your progress toward those goals; 2) to provide a basis for discussions with your mentor and co-mentor; 3) to help provide a framework for the final paper.

Richard Tips:

either reuse material from your proposal (to the extent it is relevant) or write new material that will also get used in your final report  (so that the writing does double duty).

 include your name, date, project title, co-mentors (if any); include figures that capture what the project is about; write things in a way that is understandable to a non-expert (including defining acronyms on first use, etc).

**First Interim Report:**

* **Write in some detail the motivation for your project. It should include background and an overview of the ongoing work in the research group. You should include references.**
  + Motivation: Build a Cell project (DOD proposal)
    - There are 5 primary subsystems: spatial organization, metabolic subsystem, sensing and signaling, regulation and computation, actuation
    - We choose to focus on metabolic subsystem, specifically power supply
    - Presentation: <http://www.cds.caltech.edu/~murray/talks/murray_buildacell-pasadena_24Jul17.pdf>
    - Need energy for internal reactions
    - Support metabolic processing of chemicals (?)
    - Work on re-energizing cell-free systems or preservation of native metabolic pathways in cell free extract
    - Overview of ongoing work in the research group
      * Zoila – transporter
      * David – other extremophiles extract
      * Manisha = ATP synthase as flagellum
      * Biocrnpyler/autoreduce/bioscrape
      * Others – dosage control, population control, 3d segmentation of encapsulated cells (hydrogel)
  + From surf proposal: purpose of syn bio, why we want to extend lifetimes
* **Discuss the problem you are working on and explain how it fits into the ongoing work.**
  + Do some research on ongoing work
  + Some papers have shown that it works but minimally (Jewett)
  + Some papers have shown that it works in things that aren’t e coli extract (Bowie)
  + Want to combine the two and show the purpose/use
* Explain your approach and outline the methods you have been using or expect to use.
  + Approach: Model mechanism, add functionality to software, simulate, now do minimal model, reduced model etc to get parameters
  + Methods; bioscrape, biocrnpyler, sub sbml
  + Looking at other models
* **Discuss the work you have done on your project. What progress have you made?**
  + Have been able to simulate the project
  + Have been able to understand the dynamics of the pathway – why we see what we see
  + Specific
    - ATP life extension model 1: Rheostat
    - Modeled in bioscrape/biocrnpyler
    - Added functionality to biocrnpyler
    - Parameter optimization
    - Reconsidered modelling approach
    - Parameter extraction from minimal model
    - Reduced model
      * Current challenges (SBml to ode)
* What are the challenges and problems you have met so far? What challenges and problems do you anticipate moving forward?
  + Adding functionality to software
  + Biologically relevant data
  + What are the true rate params (especially for buffer to txtl transition)
  + Crude vs Purified – how to accurately predict/know enzyme kinetics