



University of Chicago



# ANNIE- Recap of Collaboration Meeting and the Start of an Action Plan

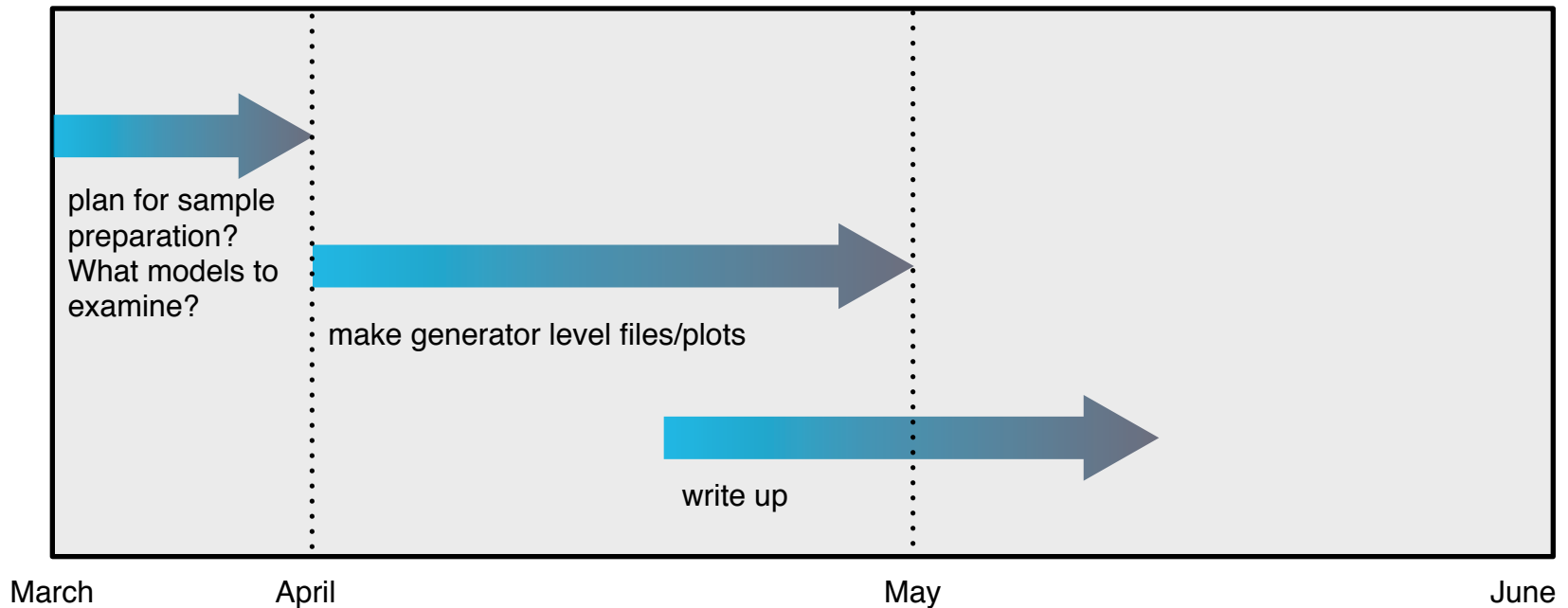
March 09, 2014

## Generator Studies

We need samples of neutron multiplicities for single neutrino-nuclei and different interaction models.

- to make frame the wide uncertainty in number of FS nucleons
- to use as inputs in physics simulations

Richard Hill, Aaron Meyer, Teppei?

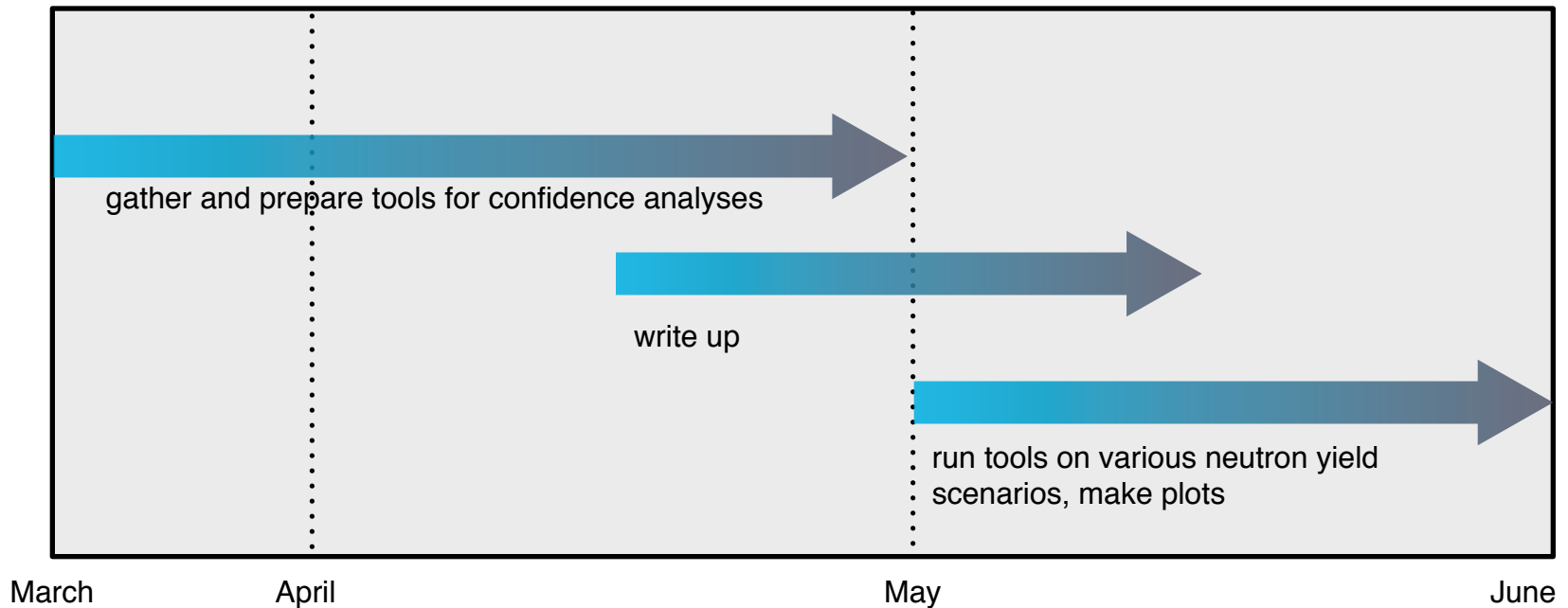


## Physics Studies

We need to demonstrate a relationship between neutron multiplicity and physics reach for (two?) test cases

- How do the various predicted abundances (weighted by the background energy spectrum) affect limit setting? How many PDK/DSNB events would be needed to declare “discovery” under various scenarios? For DSNB, any other measures of success?

Michael Smy, someone from the PDK community

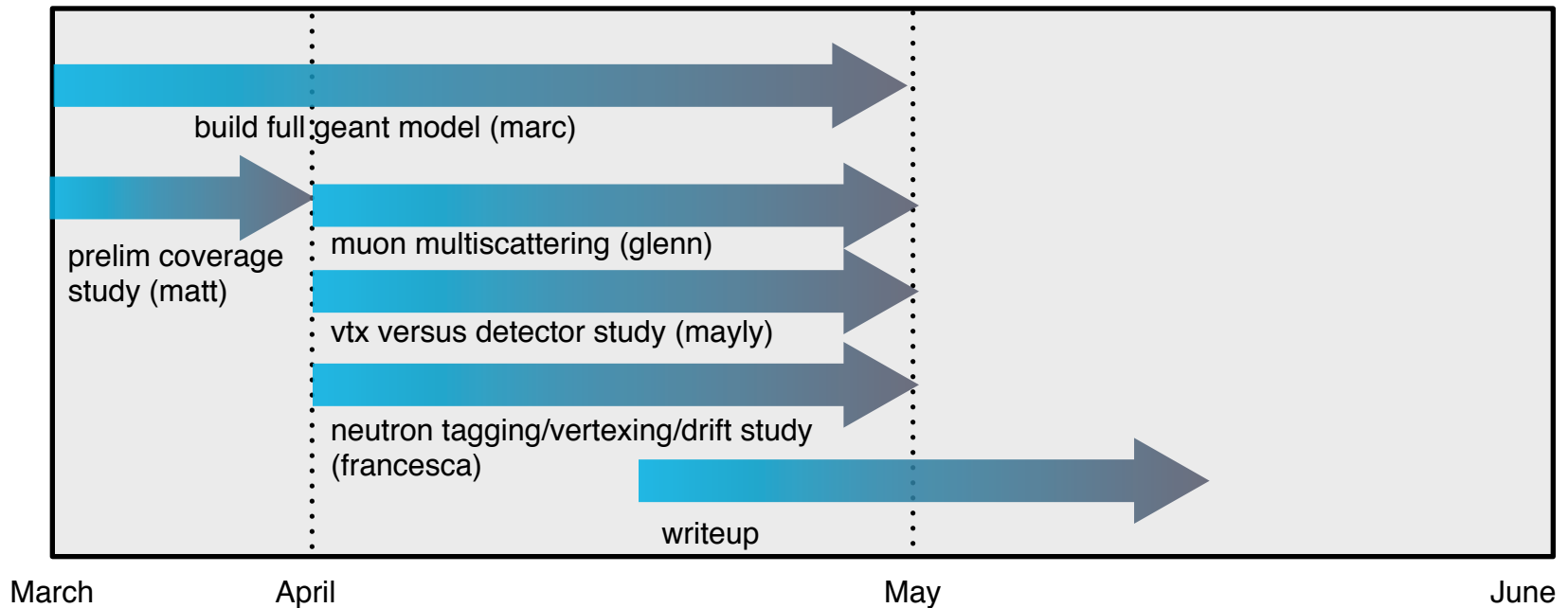


# Technical Simulations

We need to:

- Make progress towards a full simulation and reconstruction toolbox
- Run “Lite” simulations
  - muon vertex capabilities versus coverage and resolution
  - neutron tagging and dirt neutron analysis capabilities
  - ability to recognize “PDK backgrounds”

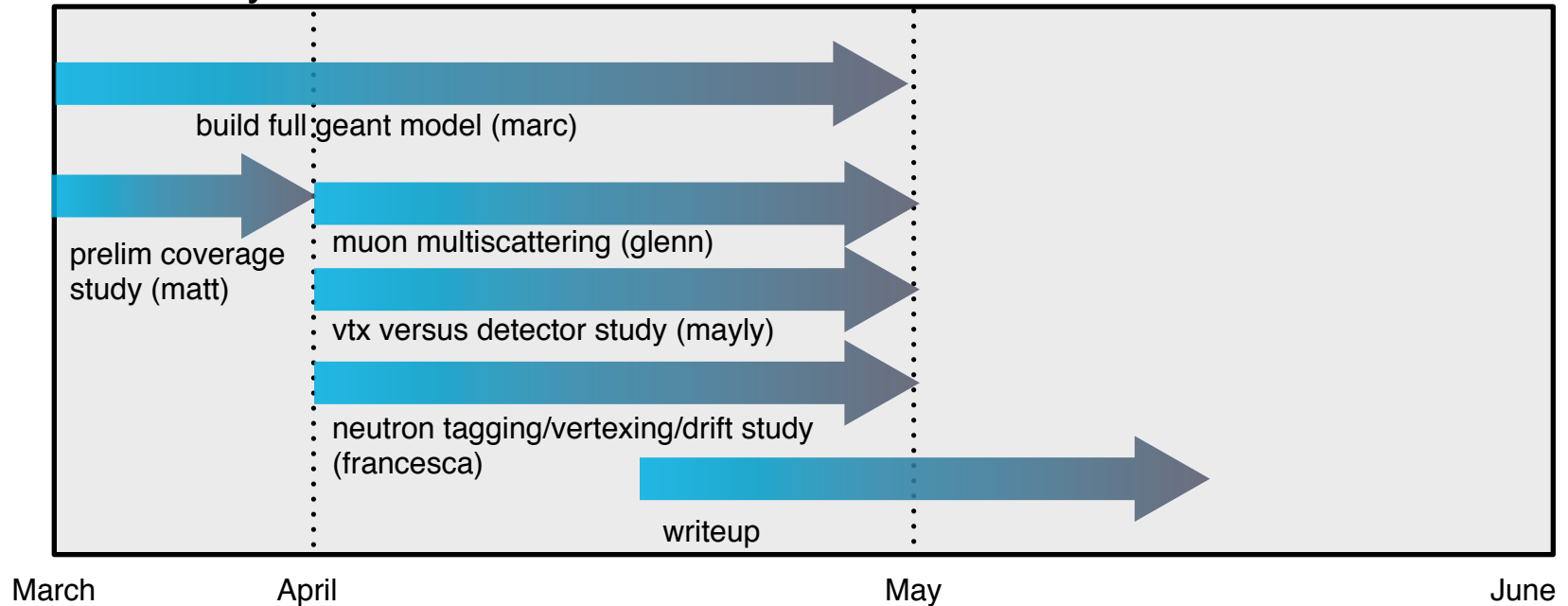
Mayly, Francesca, Marc Bergevin, Glenn, Matt?



## Technical Simulations

Regarding dirt neutrons there were several discussions:

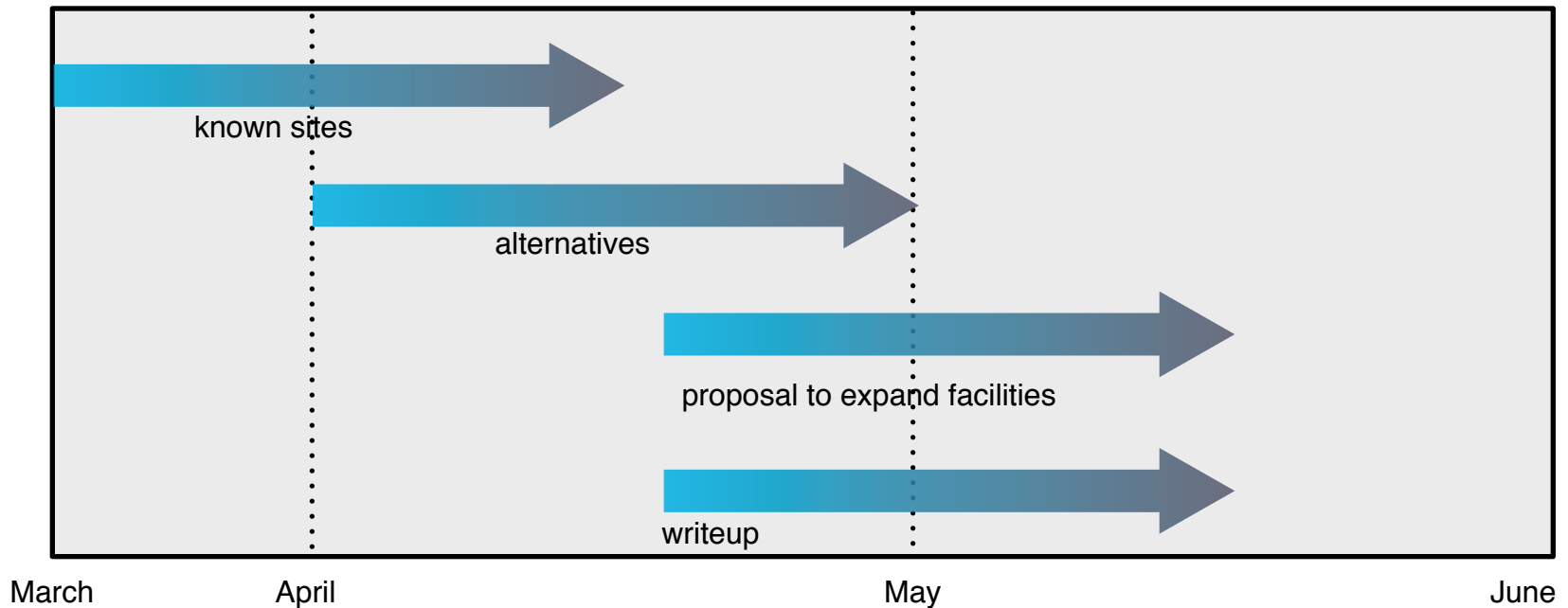
- look into the possibility of using mTC to estimate rates. MiniBooNE measurements (Rex)?
- making ANNIE longer, measure neutron capture as a function of depth into the detector (along the beam axis) for events without discernible neutrino interactions.
  - this will require LAPPDs on opposite sides to do differential timing, may affect efficiencies. What is the neutron vtx resolution?



## Site studies

We need to:

- establish final rate and energy estimates for SciBooNE, NDOS?
- check on any other alternatives with someone at FNAL?
- compare booster flux with atmospheric spectrum (Bob S)
- look into a letter or proposal (joint with LAr1?) to expand SciBooNE hall or add another shaft?

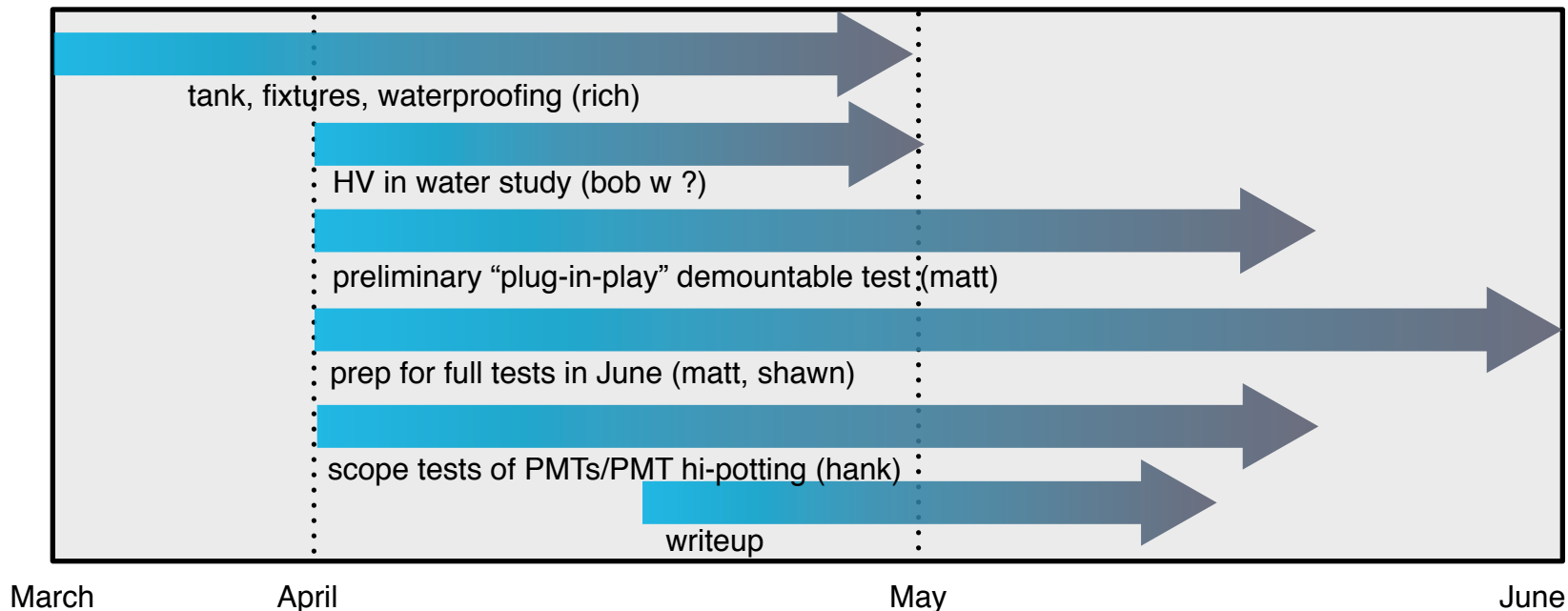


## Hardware

We need to:

- start testing PMTs
- HV development work and passive signal transport for LAPPDs
- tank design and cost, fixtures for attaching PMTs and LAPPDs
- brainstorming for active in-water electronics
- evaluate status of MRD
- perform systems testing of demountable LAPPD

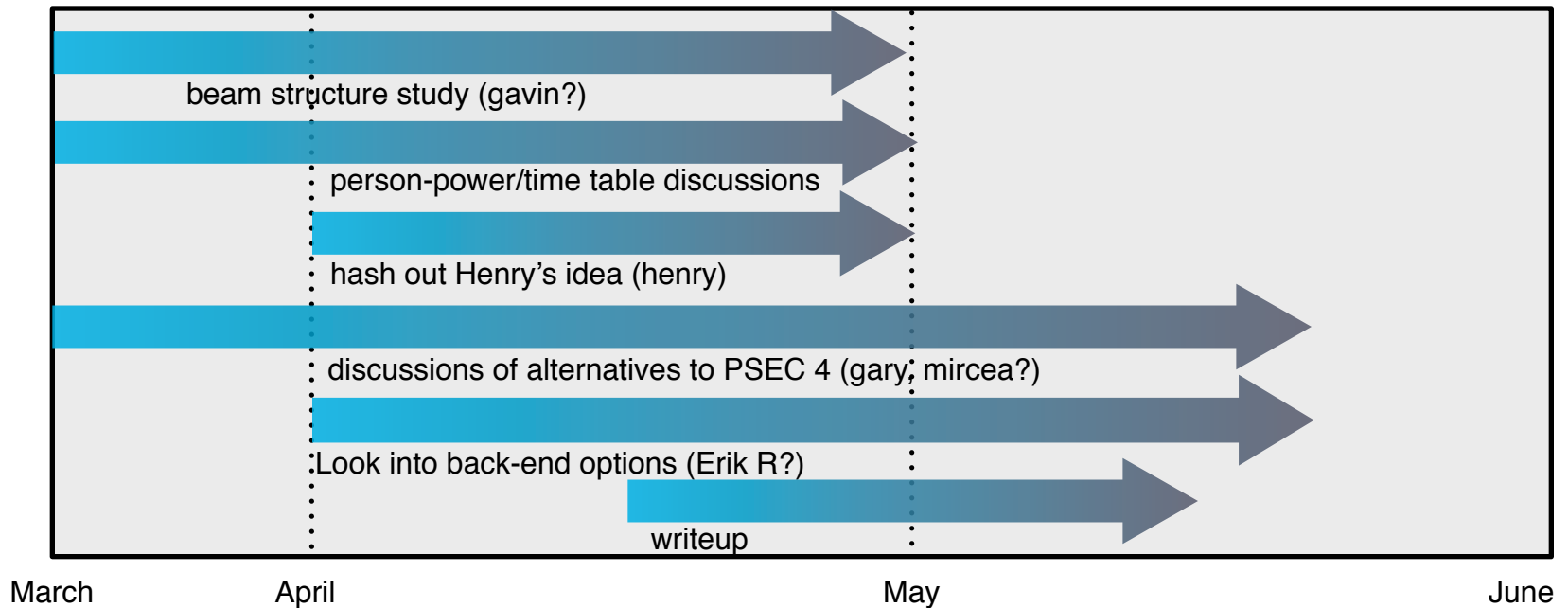
Henry, Matt, Shawn, Bob W?



# Electronics

We need to:

- Understand beam structure and timing of events (Gavin?)
- Think about allocation of person-power (Mircea + Fermilab (Braga) + a Hawai'i postdoc (PSEC, system) )?
- Possibility of using PSEC4 (hash out Henry's idea)
- Alternatives using different chips? (Gary/Mircea)?
- Back-end (Fermilab)? Henry, Gary?





## Paperwork/Writing

We need to:

- Meet again?
- Write up the LOI.
- Estimate a realistic budget and needed person-power
- Letters of support

