Notes and Questions for 1/17 Meeting

- Mention Summer research program
  - App due Feb 1st, 5k stipend for student if selected.
  - Just have to submit a project proposal - end result is only a 5 page paper
  - Plus rec letter
- Fill out 199
- Get some clarification on path and loop spaces
- Potential starting points for calculations
  - Hopf Fibration?
  - Serre Fibration? $\Omega X \to PX \xrightarrow{f} X$
- Fibrations: should I spend time relating these to fiber bundles, vector bundles, etc?
- How much should I review polynomial and exterior algebras?
- Is the LES in homotopy is useful as it sounds?
- How to come up with some "trivial" examples where an SS degenerates into LES, how to see Mayer Vietoris in the SS
- How/when does the (co)homology of the associated graded complex relate back to the (co)homology of the original space? Does this depend on when exact sequences split?
- Is cohomology just a ring, or is it better to view it as a differential graded algebra?
  - i.e., is writing $H_*(X) = H_0X \oplus H_1X \oplus \cdots = \bigoplus_{i \in \mathbb{Z}} H_iX$ a useful notion, or just notational convenience?
- Postnikov towers - are these the way to construct spaces out of Eilenberg-MacLane spaces?
- Is basically everything equivalent to singular homology?? (de Rham, Cech)
  - Follow up - is basically everything weakly equivalent to a CW complex?