AIM - Problems from Mulitidimensional Persistence Workshop

1. What is the computational complexity of computing the interleaving distance between multidimensional persistence modules?
2. What is an efficient algorithm for calculating (co)limints of diagrams over set?
3. List types of data for which persistence/TDA is useful.
4. List transformations which facilitate TDA.
5. Given an isometric embedding of a compact metric space in a metric space $\mathbb{X}$, we can think of the n points as a configuration in $\mathrm{Conf}(\mathbb{X}, n)$. Given a configuration of points in a metric space $\mathbb{X}$, we can compute the persistence diagram for the given set of points. This gives a diagram

   $$\mathrm{CptMetSp} \longrightarrow \mathrm{Conf}(\mathbb{X}, n) \longrightarrow \mathrm{PersDgms}$$

   Is this injective? Surjective? How non-injective/non-surjective is it?
6. Is the persistence diagram of density functions sensitive to information beyond the 2-pt correlation, and how far off is it?
7. For a multifiltered simplicial complex, can we compute the differentials in the hypertor spectral sequence and what do they tell us?
8. Can we use the differentials in the Adams spectral sequence to quantify the goodness of fit of geometric models for our data?
9. How do we generalize persistence to detect differences modulo composition with orientation preserving homeomorphisms?
10. What are the multidimensional persistence modules that are in the image of the functor from values in sets to values in vector spaces?
11. What quivers with relations arise in TDA that have finite representation theory?
12. How well can we approximate persistence diagrams using incomplete data? In particular, if
    - We are missing coordinates in vector data; or
    - we are missing entries in the distance matrix.
13. What is the categorical analog of the Wasserstein distance?