Issues (1. Evolving Environments)

• Is halo-mass really KING, and does it determine all the environmental dependence of galaxies?
  - It is true that there are more massive galaxies in clusters due to accelerated mass assembly.
  - Does the way they are assembled also matter? …such as mergers or smoother accretion, which is likely to be environmentally dependent at high-z?

• Is the quenching of SF self-regulated or driven by environmental effects?
  - AGN/SB feedback (high mass) versus RP/tidal stripping (low mass)?
Issues (1. Evolving Environments)

• Are SF/AGN activities boosted in some galaxies in protoclusters?  
  - How? Mergers/interactions? The mode?

• Are there any environmental effects on gaseous inflow/outflow processes?  
  - Inflow (cold streams): can be different between common haloes and isolated haloes?  
  - Outflow: suppressed by IGM pressure?
Issues (1. Evolving Environments)

• How can we properly compare ancestors with descendants if their environments and halo masses change with time due to cluster/group growth through assembly?
  
  - Galaxies were not always born or modified where they are now.
  - Proto-clusters are much rarer than present-day clusters. Therefore, many progenitors of today’s cluster galaxies were “not” in protoclusters.
  - Pre-processing can be important.
Discussion items and my preferable answers

1. Halo-mass is really king?
   ……………… Not sure yet. The way of mass assembly may also matter at high-z?

2. Quenching also by external effects?
   ……………… Yes, in particular in satellite galaxies.

3. Boost of SF/AGN activities in protoclusters?
   ……………… Maybe yes in some galaxies, probably due to mergers, but a larger sample and IFU obs. are required.

4. Inflows/outflows depend on environment?
   ……………… Yes, these are the key mechanisms on top of the merger, and should be investigated by CE and IFU obs.

5. Ancestors/descendants relation in growing environments?
   ……………… Yes, this complicates our understanding of environmental effects, and should be properly incorporated.