Summary

- Developing multi-scale and multi-modal models that are verified by data and suitable for system level optimization

What would make a difference?

- Want to see behavioral models that capture existing driver behaviors
- Want to see how behavior at an individual level affects the dynamics and energy savings of the system
- Want to validate models using real data
- May need to develop test bed to facilitate model validation

Challenges

- Want rigorous framework to go from micro-level (agent-based) to macro level
  - Behavior of molecules vs. behavior of a gas
- Need data verified models
- Need for algorithms for real-time optimization (centralized v.s. decentralized)
- Need to get buy in by demonstration in common testing environment (Grand Challenge)
- Models must be robust enough & continuously adaptable to new technologies (autonomous systems)

Modeling based optimization challenges

- Computational complexity makes larger-scale models intractable (i.e. San Francisco vs. Bay Area) and impractical to be used for optimization

- Unlikely to see solutions from existing agencies as they typically support planning - Optimization for planning is different from optimization for operation

- What do we actual optimize for? Time? Energy? Emissions? Safety?

Data for Modeling Needed

- Data collection currently going on is insufficient/inadequate for traffic models
  - Want origin & destination
  - Resolution insufficient for arterials
- Current static models & data available more geared for infrastructure planning rather than real time operation optimization
- Potential need for a test bed for proof of concepts and algorithm benchmarking