

# This is where I (Michael Ernst) come from ...

*LHC: What is the nature of mass (among other questions)? Higgs particle?*

- *~10K scientists, 33+ countries*
  - *community has developed and operate large –scale worldwide distributed computing facilities with ~140 sites*
  - *Facilities comprising ten thousands of processors, hundreds of PB of active data on disk storage, long-term data archiving, high-performance global networking*
- *Planetary lab for scientific discovery!*
- *HEP is a data-intensive science*

## *Some observations and thoughts*

- *Data-Driven Collaborations for Complex Problems*
  - *Not only HEP – every field of science (General Relativity, Geosciences, Bio, and combinations)*
- *Science and Society being transformed by Cyber Infrastructure - and Data-Driven approaches*
  - *Completely new methodologies required*
- *A universally usable cyber Infrastructure plays central role in data-driven collaborations for complex problems*
  - *No single community can attack challenges*
  - *Technical and social issues to solve – requires extensive, flexible & nimble forms of collaborations*
  - *Sharing among institutions to optimize the accessibility and use of assets deployed and supported at the laboratory and campus level*

# More thoughts ...

- *This is a good reason to catalyze development of multi-disciplinary science & engineering data collections: open, extensible & evolvable, sustainable over many decades.*
- *Requires development of a new generation of tools & services facilitating data acquisition, mining, integration, analysis, visualization*
- *Itself a discipline, computational science serves to advance all of science*
  - *despite the fundamental contributions of computational science inadequate structures within the Federal government and the academy today do not effectively support this critical multidisciplinary field*
  - *In parts addressed by OSG bringing together computational with domain scientists*
- *Universities and national labs must significantly change organizational structures*
  - *Multidisciplinary & collaborative research are needed to remain competitive in global science to effectively attack challenging science questions*