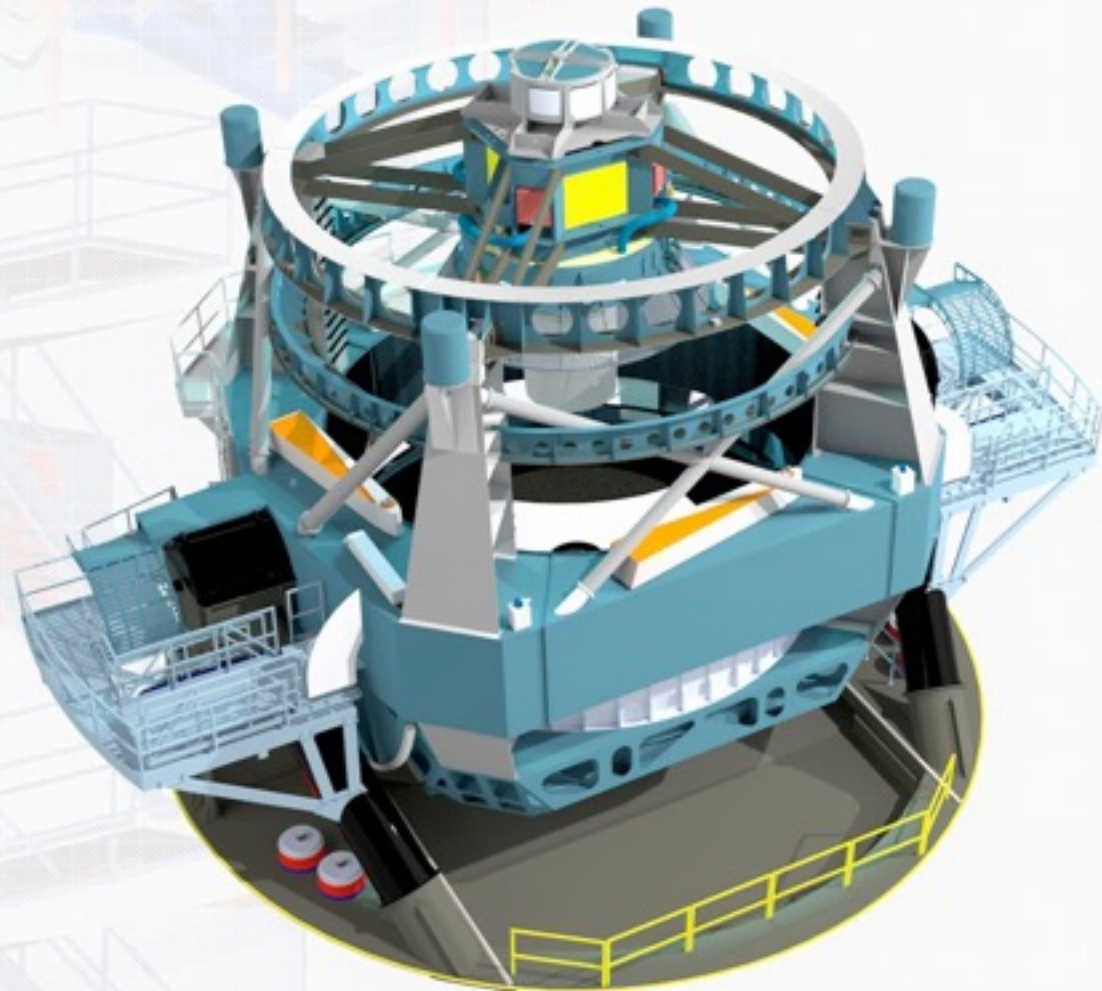# HEP Software: An LSST Perspective
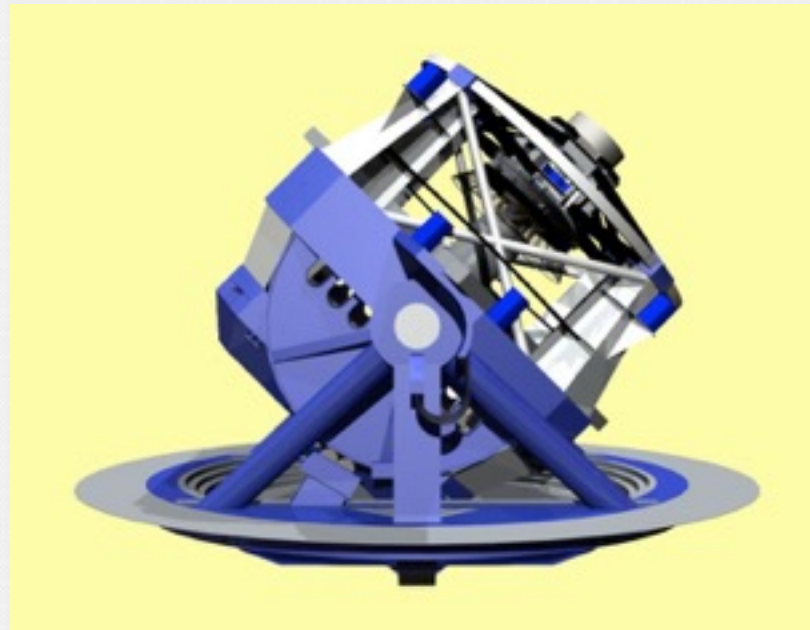
Kian-Tat Lim
LSST Data Management
System Architect

Brief Overview of LSST

- Large mirror (8.4 meters)
- Large camera (3.2 gigapixels)
- Large survey (25,000 square degrees)
- Large computing (1.8 PFLOPS)
- Large data archive (0.5 EB of images)

LSST Software Needs

- Real-time control
- Configuration management and provenance
- Workflow and process control
- Data movement and distribution
- Data and archive management
- Extremely large (multi-PB) database management

- Also: Image processing and measurement

LSST Experience: Off-The-Shelf Packages

- Adding more packages adds capability and reduces development cost but increases distribution and maintenance difficulty

- Choose packages that are widely used and well-maintained
  - Vetting by a central group can enhance reputation

- "Best documentation wins"

LSST Experience: Building Communities

- FITS: common data format
- IRAF: common analysis framework
- ADASS: software-oriented conference
- VO: standardization of protocols
- AstroPy: next-generation analysis framework
- Public data: survey is a utility for the entire community

The LSST Core Stack

- High-performance image processing and analysis system
- Ensuring code is reusable and extensible
  - Enable pieces to be used wherever possible
- Identifying user environments
- Using best practices and even personnel from commercial/ Open Source world
  - Experience in building reusable software

LSST on Potential Activities

- We're on GitHub, since that's where the community is
- Build and test: our own, including porting
  - If we outsource, would likely be to a public service
- SW distribution and packaging: home-grown, moving away
- Everything is GPL3
- Borrowing testing resources (XSEDE, NCSA, IN2P3)
- Could use licensed tools, training, expert pool for reviews, consultants
- Using expertise of LSST-contributing institutions
  - XLDB conference helps
- Core software needs are not very overlapping with LSST
- Astro needs developer career path, too
  - Working on publication and citation for software through AAS