SCIPP Contributions to the GLAST LAT Science Instrument

- **GLAST LAT Conceptual Design:** Bill Atwood devised the initial LAT concept in 1992 and began simulating it to verify the background rejection capabilities. The original concept was very similar to the final instrument, but with a 10×10 tower array (instead of 4×4).
- **Beam Tests:** Robert Johnson's group led the design and assembly of tracker prototypes used in the 1997 and 1999 SLAC beam tests that demonstrated the performance of the design concept.
- **Balloon Flight:** The second beam-test tracker was modified at UCSC to fly on a high-altitude balloon over Texas in 2001.
- **Tracker Readout Electronics:** Johnson's group, with additional engineering support from SLAC, designed, tested, and debugged the readout electronics, for both the beam-test and flight trackers. The design includes two custom integrated circuit chips (ASICs).
- **Silicon-Strip Detectors:** Hartmut Sadrozinski led the effort to design and procure the more than 11,000 detectors produced by Hamamatsu Photonics.
- **Tracker Construction:** Johnson served as the subsystem manager for engineering and production of the LAT flight tracker.
- **Tracker Engineering and Production:** UCSC personnel designed and prototyped much of the intricate tracker interconnects. All of the ASIC production testing was done at UCSC, and the UCSC group led the production testing and burn-in of the readout electronics modules.
- **Radiation-hardness Assurance :** The radiation-hardness testing of most GLAST LAT ASICs and many crucial electrical components was led by UCSC personnel with active involvement of undergraduate students.
- **GLAST LAT Proposal:** The UCSC group wrote the tracker section and edited the successful 1999 proposal to NASA and contributed to the simulations needed for the proposal.
- **Tracker Reconstruction Software:** Atwood and the UCSC group, working with SLAC, led the development of the software for offline reconstruction of tracks from tracker data.
- **Background Rejection:** Atwood led the development of the offline analysis software used to distinguish gamma-ray events from cosmic-ray backgrounds.
- **Flight Software:** Terry Schalk served as a manager of the LAT flight software effort.

Participants

- **UCSC Faculty:** Bill Atwood, Robert Johnson, Hartmut Sadrozinski, Terry Schalk
- **UCSC Research Physicists:** Ariane Frey, Jose-Angel Hernando, Masa Hirayama, Wilko Kröger, Troy Porter, Mutsumi Sugizaki, Pablo Saz-Parkinson, Marcus Ziegler
- **UCSC Graduate Students:** Brandon Allgood, Brandon Anderson, Brian Baughman, Nate Bezayiff, Michael Dormody, Christine Ing, Yuko Nakazawa, Richard Rennels
- **UCSC Undergraduates:** Elizabeth Atwood, Andrea Bangert, Chastity Bedonie, Jeff Clark, Naomi Cotton, Zack Dick, Nathan Frank, Colleen Milbury, Kamal Prasad, Todd Reed, Tobias Schutz, Gene Sher, Jeff Wheeler, Barry Zink
- **UCSC Engineering & Technical Support:** Mark Anderson, Valon Chen, Sergei Kachiguine, Forest Martinez-McKinney, Gerrit Meddeler, Gwelen Paliaga, Pavel Poplevine, Delbert Rasmusson, Ned Spencer, Zhigang Wang, Alec Webster