Contributing to ILC Software Projects

Requesting Bug Fixes and Improvements

The ILC Jira tracks bugs, feature requests, and possible improvements to existing software packages. Everyone is encouraged to add an item into the Jira when a bug is found in ILC software.

These Jira projects are specific to ILC simulations.

- org.lcsim - Java reconstruction and analysis package
- Geometry Converter - Java geometry conversion for org.lcsim
- LCIO - Linear Collider object model and persistency framework in C++, Java, and FORTRAN
- SLIC - C++ simulator package in Geant4 framework
- LCDD - C++ geometry description in Geant4 framework using GDML

Several other software packages are of more general interest.

- JAS3 - Java-based HEP integrated development environment
- AIDA - plotting interfaces
- JAIDA - Java plotting implementation
- WIRED - event display using HepRep

Becoming a Developer

Before making any changes to ILC software, you need an account at the SLAC CVS.

> ✅ **CVS Account**
>
> Email tony_johnson@slac.stanford.edu to request a SLAC CVS account.

Follow the CVS Instructions to checkout the software projects of interest.

The reconstruction software is based on the Java language, which you'll need to learn if you want to contribute. Sun's Java Tutorial Book is an excellent place to start if you are new to this language.

> ✅ **Python, Too**
>
> Scripts can also be written in the Python language using the Jython interpretter.

Read over the development tools section to learn about the tools we use to build and development the software.

Work through the Getting Started Tutorial to learn about the basic concepts.

Lists of Project Ideas

A list of specific issues was compiled at the ALCPG Simulation and Reconstruction Workshop.

Jeremy McCormick maintains a list of project ideas. (Real bugs and feature requests go into the Jira.)

Some Example Projects

- Geometry System in Reconstruction
  - allow geometries to come from multiple input files
  - improve interoperability
    - access Mokka or JUPITER geometry data
    - ID decoding for detectors not run with SLIC

- Reconstruction
  - process LCIO files using both org.lcsim and MARLIN

- Simulation Software
  - support for putting GDML data in multiple input files
  - additional calorimeter readout types to the LCDD package or improve on existing readouts
  - CAD interface
    - use case - LAPP ECAL for SiD

- Simulation Validation
  - investigate and characterize effects of range cuts and physics limits on Geant4 simulation
  - comparison of different physics lists (preferarably with real data, too)
    - single particle response of h0, in particular

- Event Generation
    - python wrapper to the different generators used at ILC, e.g. Pythia, Isajet, etc.
    - SUSY StdHep files for benchmarks

- Testbeam
    - use JAS3 and org.lcsim to create a data analysis application for the Calorimeter testbeam
    - do some analysis on real ECAL data

- AIDA (+ Plotting)
    - binary data format in order to store Ntuples
    - 3D plotting

Links

A University Program of Accelerator and Detector Research for the International Linear Collider (vol. III)