

## ***Instructionally Related Activities Report Form***

SPONSOR: GEOFF DOUGHERTY  
PROGRAM/DEPARTMENT: MATH & APPLIED PHYSICS  
ACTIVITY TITLE: CERN INTERNSHIP  
DATE (S) OF ACTIVITY: 1<sup>st</sup> JUNE – 10<sup>th</sup> AUGUST, 2016

Please submit via email to the IRA Coordinator along with any supporting documentation at [david.daniels@csuci.edu](mailto:david.daniels@csuci.edu) within 30 days after the activity. Thank you for your commitment to engaging our students!

### **A. ADDRESS THE FOLLOWING QUESTIONS:**

#### (1) PROVIDE A DESCRIPTION OF THE ACTIVITY;

The student joined a research group, and was supervised locally by Dr. Dan Guest, a CERN faculty member, for a period of 10 weeks. His project was "Event Displays - Atlas Data to iSpy"

His project involved the conversion of Atlas detector collision data (saved in ROOT files, and comprising several hundred-thousand lines of XML) into a format that the iSpy 3-D Event Display could read. Writing the scripts in Python to convert the data required a piece-by-piece approach to handling the sections that iSpy would eventually display.

#### (2) HOW DID THE ACTIVITY RELATE TO A COURSE(S) AND/OR LEARNING OBJECTIVES?

The activities were closely related to the preparatory courses (Phys 497), in which he learned how to program in ROOT and the basics of fundamental particle physics.

#### (3) WHAT DO YOU SEE AS THE STRENGTHS OF THE ACTIVITY?

The internship taught the student how to work collaboratively in a team with top international physicists and engineers, and take responsibility for a specific part of the team's project. It showed him the level of effort, commitment and performance required to succeed in such an environment. The project challenged his computing skills and understanding of nuclear particle collisions.

#### (4) WHAT WOULD YOU SAY ARE/WERE THE ACTIVITY'S WEAKNESSES?



CERN faculty members generally take a 2-week vacation during the 10 weeks, and a back-up advisor was not always available. This is being addressed for future visits.

(5) HOW WOULD YOU IMPROVE THIS ACTIVITY FOR NEXT TIME?

It would be useful if coordination with CERN could deliver more specific details of each project that our students will work on at an earlier stage, say some weeks before they travel.

(6) WHAT DID YOU LEARN FROM THE PROCESS?

It was very interesting to be exposed to the procedures at CERN, and to see the multi-faceted research approach that has led to so many fascinating discoveries. It was also good to see that our best students are on a par with the best from around the world.

(7) WHAT ARE STUDENT RESPONSES TO THE ACTIVITY? ATTACH STUDENT EVALUATIONS OR ASSESSMENTS (IN ACCORDANCE WITH FERPA RESTRICTIONS YOU MUST REMOVE ALL PERSONALLY IDENTIFIABLE STUDENT INFORMATION)

See attached.

8) GIVE A SUMMARY OF EXPENSES FOR THE ACTIVITY (DO NOT INCLUDE ACCOUNTING STRINGS)

Accom	3710.29
Ground transport & per diem	1243.90
Air	<u>1604.76</u>
Total	6558.95

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**B. ATTENDEE LIST- SUPPORTING DOCUMENT:**

In addition to the report form, *in a separate document*, attach to your email a list of attendees complete with each student major and grade level. This for IRA Committee reference only and will not be published on the IRA website. Include your name and the title of your IRA activity on the document.

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California State  
University

**INSTRUCTIONALLY  
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ACTIVITIES**

**C H A N N E L  
I S L A N D S**

**C.IMAGES FROM ACTIVITY:**

Please embed 3-5 images in this document (or attach in .JPEG format) that demonstrate student participation with captions/titles.



*Figure 1 Taylor Dinkins and Dr. Dougherty near CERN labs*



*Figure 2 Taylor Dinkins and Dr. Dougherty at CERN*

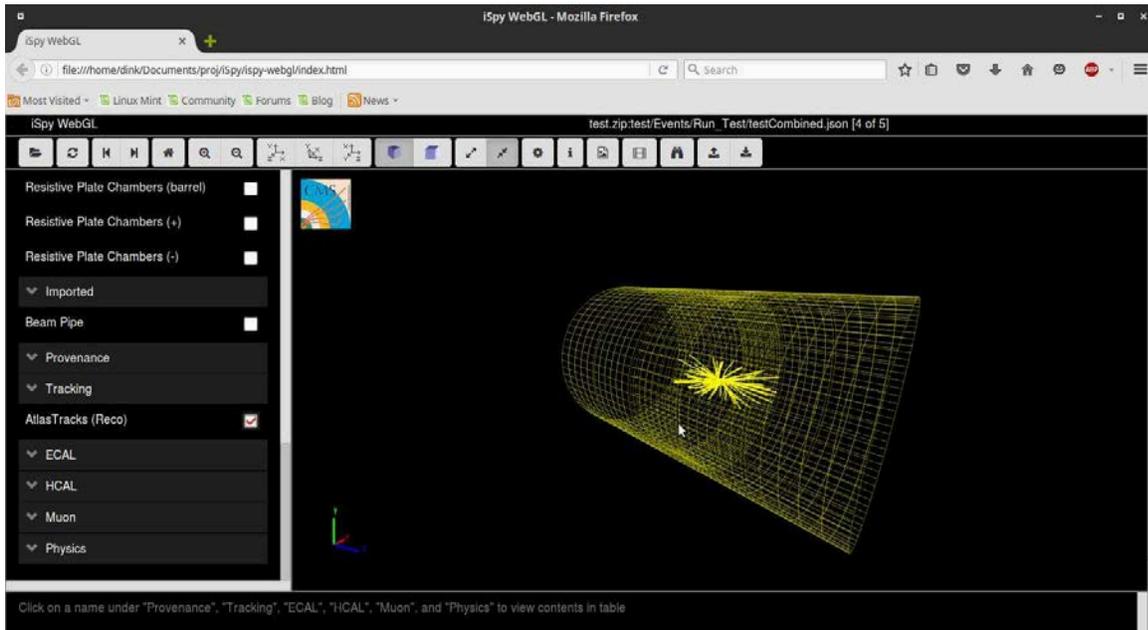


Figure 3 Screen shot from Taylor's project



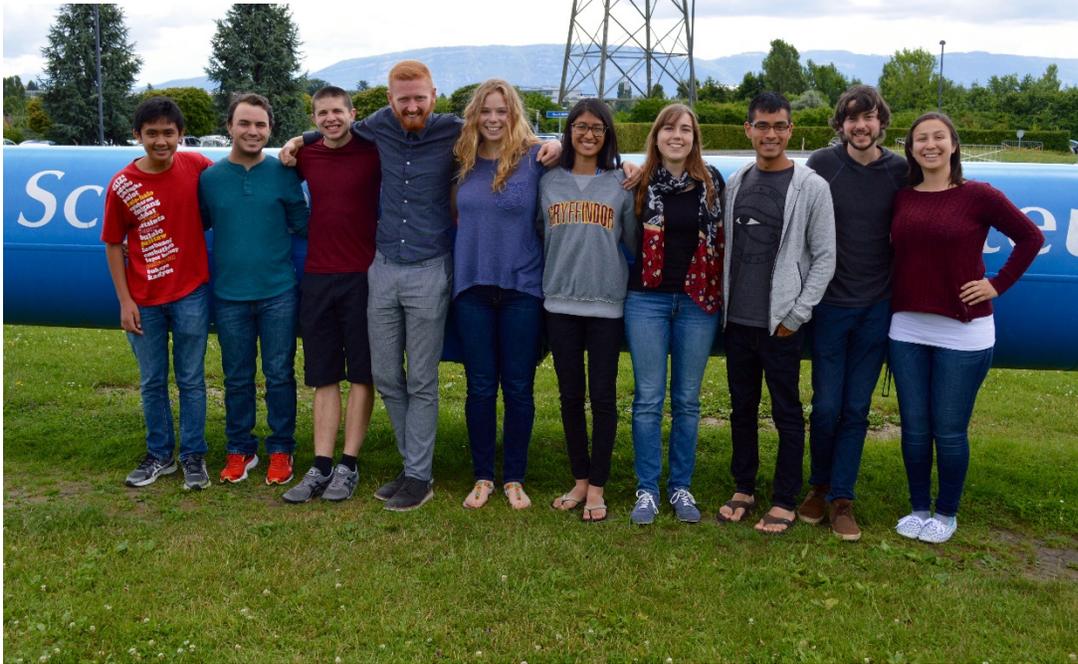
Figure 4 Collision data collector



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*Figure 5 CSU interns*