



**Attachment OUT to the  
Memorandum of Understanding LIGO-M050315-00  
between the Hobart & William Smith Colleges LIGO Group (HWSLG)  
and the  
Laser Interferometer Gravitational Wave Observatory (LIGO)  
For The Period  
August 15, 2007 - August 14, 2008**

This Attachment OUT to the Memorandum of Understanding LIGO-M050315-00 defines the role of the Hobart & William Smith Colleges LIGO Group (HWSLG) as a Member of the LIGO Scientific Collaboration (LSC) in support of Education and Outreach to the broader community. The period of performance for the activities in this Attachment is from August 15, 2007 - August 14, 2008.

### **1. Education and Outreach**

As a frontier physics effort, LIGO offers a unique opportunity to inspire interest in science among students and to educate the broader community. The LIGO Laboratory supports a broad program of education and outreach to take advantage of these opportunities.

Activities to attract and educate visitors take place at both Observatories, as well as the development of educational materials for use there and elsewhere.

The LIGO Laboratory is building a Science Education Center at the Livingston Observatory, and is participating with local partners to make it a vehicle for science education throughout the region. LSC groups are invited to participate in these activities, and to suggest others, with the goal of leveraging activities to make a greater impact.

This MOU Attachments defines the role and responsibilities of groups in this development group.

### **2. Participation**

During the period August 15, 2007 - August 14, 2008, the members of HWSLG will participate in in LDG in the following areas:

a. Educational Materials Developed

*Not Applicable*

b. Other Contributions

I am on the executive committee of the APS Topical Group on Gravity. The group focuses on promoting gravitational research within the Physics community and in the public. Our work has focused on how to grow the TGG into an APS division, how to restructure the April APS meeting to better serve our community, how to

promote better communication within the gravity community, and how to develop improved outreach to the public. As an experimentalist from a small college performing research with LIGO, I feel that I bring an important voice to the table in determining TGG policy. The TGG's main outreach effort is its speaker bureau, which matches articulate gravitational researchers with institutions requesting speakers.

In October 2006, Michele Punturo of Virgo and I organized a LIGO-Virgo thermal noise meeting. The meeting, which took place at Virgo, had 20 talks and over 50 attendees. The meeting was very successful, much more so than Michele and I had imagined. It was not merely the quality of the talks, which was excellent, but also the level of cooperation that the meeting inspired. Previous to this meeting, the discussions of a LIGO-Virgo collaboration had focused primarily on data analysis. Not that technical collaboration was shunned, but it did receive less attention. During this meeting the questions that lingered on everyone's mind was, Could our two collaborations work productively together on technical research in a way that felt mutually beneficial and respectful, and how would this work exactly? By the end of the meeting, I think that the answer to the first question was a unanimous **Yes**. However the exact form of the collaboration was still unclear.

See:

<http://wwwcascina.virgo.infn.it/collmeetings/DMwebpages/LIGO-Virgo-TNM/index.html>

Since that meeting, LIGO and Virgo have entered into a formal collaboration, and we are now having joint meetings. This move is a very positive step forward, but there are still areas of the technical collaboration that remain a bit undefined. For example, while the analysis groups have joint telecons, the technical groups do not. It is true that our work is more narrowly tailored to our respective detector designs, but our research is similar enough that I think it would be helpful to have joint monthly telecons. Certainly, interacting on a semiannual basis at two LIGO-Virgo meetings is not enough. At the October LIGO-Virgo meeting, I hope to organize a session for technical researchers in which we can discuss how to make our interaction more frequent and more productive.

In 2004-05, I started a program with Greg Baker, the physics teacher at Geneva High School, in which a senior elective class would use LIGO as way of teaching advanced concepts in physics. The class is taught as part of the AP Physics C course at GHS. Currently the school lacks the resources to be able to teach a separate LIGO-based course. Unfortunately, that project has been on hold for the past year. We had hoped to move the project in a direction where the students could engage in research projects, similar to what Dale Ingram had done before joining LIGO Hanford. However with my current teaching and research requirements and with Mr. Baker assuming an administrative role at the high school, we have not had sufficient time to make that program viable. The interest certainly exists, but not the time. In part, my research effort has been expended to handle the Enhanced LIGO suspension thermal noise project. And in addition, my teaching time has been increased with the development of a new Advanced Laboratory class, a new Computational Methods class, and a new student peer-instruction program. This year I must also prepare my file for tenure. I plan to meet with Mr. Baker at the start of the school year so that we can assess the situation. For the next year I believe we will either continue to keep the program on hold, with the

expectation of reviving it after my tenure file is submitted, or we will try to reinvigorate the class but have the educational program leaders at LHO and LLO assist Mr. Baker in reviving the class material. A third option is to terminate the program, but I would rather make that decision only if the first two options prove unviable.

### **3. Resource Sharing**

The LIGO Laboratory will contribute resources including allocation of appropriate scientific and engineering personnel, research facilities, and funding in support of the effort in Item No. 2, as indicated below.

- a. Research accommodations for HWSLG group members while on LIGO research assignment at any LIGO Laboratory site.

*Not Applicable*

- b. Access to LIGO data through established LSC channels in support of this work.

*Not Applicable*

### **4. Coordination and Reporting**

HWSLG will perform research within the structures established by the LIGO Laboratory and the LSC where appropriate. In particular, activities described in Item 2 will be carried out with the LIGO Observatories Educational and Outreach Leaders.

This includes keeping the Group leaders informed of activities and plans, reporting to the group at meetings and telecons, and through technical documents submitted to the LIGO Document Control Center.

In addition, an annual report will be submitted with the update to this Attachment, giving a summary status on research by topic as indicated in Item No. 2, including progress against the milestones if any, significant accomplishments such as new insights/discoveries or publications, issues of concern if any, and an indication of invested time.

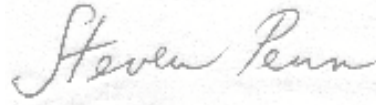
This Attachment will be updated at least annually with a plan of activities for the succeeding one-year period. These documents will be due one month before the close of the period of performance under this Attachment.

### **5. Computer Code**

All computer code delivered to the LSC under this Attachment must be developed in consultation with the LSC Data Analysis Software Working Group (DASWG) and archived, documented and reviewed as determined by that group.



Jay Marx  
**LIGO Laboratory Director**



Steven Penn  
**Principal Investigator(s)**  
**HWSLG**



David Reitze  
**LSC Spokesperson**