# Education and Outreach

In the fall of 2014, we received reports from the summer 2014 US CMS E&O mini-grants. They were:

* Iowa: Supporting HS teachers to do HCAL research
* Rochester: Supporting girls HS physics summer classes
* Brown: Develop materials and supplies to staff the Waterfire festival (a Providence-wide, fall-long event with high traffic).
* Brown: Develop algorithm and coding to run Tier 3 CMS analysis on the Grid
* Boston: Develop a mini CMS Center, suitable for Quarknet and Masterclasses
* Iowa: Design and build models of CMS using 3D printing technology.

Most grants achieved their goals completely. Two achieved significant progress, but fell short of their final goal. The Brown grant to staff the Waterfire festival managed to do all preparations, but was not selected to participate in the festival. Instead, the presentations occurred on the Brown campus. The PI intends to apply again for the festival in 2015. In addition the Iowa proposal to build models of CMS was successful, however their stretch goal, which was to instrument these models with cosmic ray detection instrumentation has not yet completed. However, the group has been able to make models of the CMS detector using 3D printing technology. We have decided to build models of the detector to be sent to all participating U.S. CMS institutions, plus a few to DOE and NSF so they can show CMS to people who even higher in the national science funding community.

In the spring of 2015, we put out a call for proposals for the summer 2015 U.S. CMS E&O mini-grants. The successful proposals were

* Florida: Support an effort to adapt the Oculus Rift 3D viewer to make three dimensional representations of CMS event displays
* Iowa: Supporting HS teachers to do calorimetry research
* Maryland: Support a chemistry teacher to write lesson plans and units of how chemistry plays a big role in HEP detector technology
* Rochester: Supporting girls HS physics summer classes
* Sienna College/Cornell: Support undergraduates to build a cloud chamber using Peltier coolers, rather than dry ice. One unit will be given to the Quarknet program for evaluation and the grant was predicated on an article being submitted to a journal and a presentation at national conference.
* Notre Dame: Support two summer high school teachers to work on Shashlik technology and to help build the optical decoding units for the HCAL upgrade
* Waubonsee/Fermilab: To support a summer seminar program to teach local area high school teachers of particle physics.

The U.S. CMS video program is going strong. During the fall, we made videos on The Big Bang theory, Quantum Foam, Cosmic Inflation and Superstrings. In addition, we made a parody of the hugely successful video “#Hashtag” by Jimmy Fallon and Justin Timberlake. In the spring, we made videos on GUTs and TOEs, The LHC accelerator, the LHC experiments and Complex (i.e. self-interacting) dark matter.

Our “Got a Minute?” video series is going well. These videos are one or two minutes in duration and use young physicists. The goal of this program is multifold. We train the young physicists to appear more natural on camera. The videos are suitable for Quarknet and Masterclasses, as well as being useful for reporters who need a short explanation of a physics topic. Finally, these videos are useful for physics faculty to show their department and are also suitable for department web pages.

In anticipation of the resumption of operations of the LHC, I contacted the alumni magazines of all U.S. CMS institutions and pitched stories that would highlight the impact of the respective university’s faculty. Caltech has requested a story, but the faculty declined to cooperate. For UCLA, U.S. CMS Education and Outreach coordinator wrote an article for their summer 2015 issue of UCLA magazine.

We continue to try to place stories in visible national magazines about the LHC. We have been in contact with NBC, Newsweek, Scientific American and NOVA about the LHC reboot. Projects with all of these media outlets are ongoing. In January, NOVA showed an episode that highlights the LHC.