

Facilities, equipment, and other resources

Siena College provides a unique array of outstanding scientific, reference and research facilities for a small liberal arts college. The J. Spencer and Patricia Standish Library is a 72,000 square foot building that provides wireless access, over 100 computer workstations, a computer lab and a 40-seat screening room. Moreover, through collaborative exchange agreements with nearby Rensselaer Polytechnic Institute (RPI) and the University of Albany, there is extensive access to first-rate research library facilities.

The Morrell Science Center (MSC) is a 55,000 square foot science center with 24 research labs, 10 teaching labs and three support areas on three floors. There is also a small machine shop for manufacture of prototype parts and lab apparatus. The School of Science maintains an independent network that includes two Apache web servers integrated with two file servers (Dell PowerEdge 2650+ servers with Dual Xeon processors running RedHat Enterprise Linux ES 3.0), and an Oracle-based database server. Collectively, this amounts to over 10TB of total storage. The school also maintains twelve electronically enhanced classrooms (EECs) and labs that each includes a projector, sound system, and podium computer. The Department of Physics uses technology extensively for teaching, with both Python and MATLAB as the standard program in the majors sequence. LabView and Mathematica are also used.

Siena has recently (Summer 2014) completed the construction of the Stewarts Advanced Instrumentation & Technology (SAInT) Center with the goal of establishing Siena as a leader in undergraduate education in scientific instrumental resources and training. The Center is located in a newly renovated laboratory space in MSC. New Instrumentation was purchased including multiple mass spectrometers, an atomic force microscope, a scanning electron microscope, and other analytic equipment. The college has hired Dr. Kristopher Kolonko to act as the director of the SAIInT Center to maintain the instrumentation, provide training and support for students and faculty, and coordinate of the use of instrumentation with both internal and external users.

Another new addition (2013) is the Siena College High Performance Computing Center (HPCC). The HPCC cluster has 252 2.3 GHz Intel Xeon (E5-2630) cores and 20.5 TB of global storage. Each worker node has 500 GB of local storage and 32 GB of RAM. A full suite of software tools and compilers are available on the cluster and both the PI and students have access to this resource.

Siena College provides all the structural scientific and research facilities necessary to carry out the proposed research program. The PI has dedicated office space in Roger Bacon Hall, which houses the Department of Physics & Astronomy within the School of Science. He and his students utilize a 600 square foot laboratory dedicated for astrophysics research. This lab currently holds four dedicated, reasonably modern Dell computers running Redhat Linux, providing remote access to a departmental server housed in the College's Data Center.

Over the past decade, Siena has undergone a transformation as it relates to sponsored research activities and undergraduate research participation due to the exponential growth in grant monies procured from federal funding agencies such as NSF, NASA, NEH and the U.S. Department of Education. The College established a Center for Undergraduate Research and Creative Activities (CURCA) to foster a campus-wide culture in which all undergraduates are engaged in investigations conducted in collaboration with a faculty mentor that makes an original intellectual or creative contribution to a discipline or the community. The center's resources facilitate and enhance the research experience for all undergraduates, including students funding by external grants. Students are encouraged to take part in national poster events such as the Council on Undergraduate Research "Posters on the Hill" event held each year at the Capitol in Washington, DC, and the National Conference for Undergraduate Research event that is attended by more than 200 students and faculty from some of the best colleges and universities in the nation. The ultimate goal of the center is to prepare highly engaged and motivated students to pursue post-baccalaureate opportunities upon graduation at top-tier national universities. CURCA has been particularly supportive of the work by the PI on CMS efforts, supplementing the previous grant with travel funds so that additional students could present their work at American Physical Society meetings.

This proposal is structured around a collaboration with Cornell University that will provide the PI and Siena students with access to Cornell's graduate students, post-docs, and faculty. Siena collaborators have access to a subset of Cornell's computers in the High Energy Physics experimental group and are able to access these computers remotely from Siena. Cornell University is a three-hour drive from Siena College.