

# Chemistry Crusaders

by Stefan G. Koenig, Ph.D.

Catholic educational institutions in the U.S. have a storied history in athletics, as well as in academics, dating back to 1789. Holy Cross, the oldest Catholic college in New England (1843), sits in a hilltop setting in the city of Worcester, Massachusetts ([www.holycross.edu](http://www.holycross.edu)). The school is focused exclusively on a broad liberal arts undergraduate education with 2700 students on campus pursuing bachelor's level degrees. Its chemistry department is American Chemical Society-certified, and regularly produces a steady stream of well-trained undergraduates, typically more than twenty per year. Motivated by Jesuit traditions that emphasize open inquiry, a sense of purpose, and service to others, Holy Cross has made a major impact on science, locally and beyond.

On campus, Holy Cross students participate in a two-decade-old Discovery Program, four semesters of chemistry that introduce material and laboratory work to students via a "guided inquiry approach." New facilities on campus include a 40,000 square foot chemistry building as well as a renovated 100,000 square foot "integrated science complex," which is due to open in January, 2010. According to Rick Herrick, Ph.D., chemistry professor and science coordinator, the \$65 million complex "will benefit all science departments." Herrick also guides the Clavius program of National Science Foundation (NSF) S-STEM grant-supported scholarships that enable students to "focus on their studies and become involved in research. This will help them pursue careers in science after they leave Holy Cross."

Ken Mills, Ph.D., an associate professor and co-chair of the biochemistry concentration, has been at Holy Cross for 9 years. His laboratory research focuses on protein splicing and his undergraduate co-workers each work on their own independent research projects. The goal of this arrangement, funded by a five-year grant from the NSF, is to facilitate independent scientific thought. Mills believes that if students can "learn to analyze and interpret data...and dig into the scientific literature, they can learn to be nimble thinkers," better preparing them for their careers.

In the area of community engagement, Holy Cross has collaborated with the Worcester Public School system since 1988. In the summer of 2009, Holy Cross invited 19 Worcester middle-school teachers to the College Street campus to engage with Herrick and mathematics professor Sharon Frechette, Ph.D., on the interface of chemistry and math. This second of three annual workshops was made possible by a \$150,000 grant from the Massachusetts Department of Higher Education. The grant's mission is to help teachers improve students' quantitative skills as they relate to science. The program is designed to positively influence students' classroom experiences and encourage them to pursue careers in math and science.

Science Ambassadors is a Holy Cross student outreach program that "regularly performs science demonstrations at local schools." Jude Kelley, Ph.D., a third-year associate chemistry professor and the group's current adviser, states that "it is not...tied to one department" and that the program "brings in students with a broad range of backgrounds." One of the more popular attractions, the annual 'Hogwarts at Holy Cross', draws hundreds of children and their parents for hands-on activities, as well as a science show in which "Holy Cross students and faculty (some dressed as their favorite [Harry Potter] characters)...perform more sophisticated experiments."

In 2008, Kelley appeared in a History Channel episode of *Modern Marvels*. The show,

which included demonstrations and interviews, focused on the importance of iron as a component of steel and its impact throughout history. Also highlighted were the significance of the metal in astronomy, biology, chemistry, geology, and physics. Says Kelley, “The project was a fun fusion of art and science, very much in line with the Holy Cross experience.”

Holy Cross appears to have chemistry in its blood, consistently acting to spread that knowledge to students expressing an interest in science, both at the school and in the greater community. An amusing story on the origin of the schools’ color – purple – has it that a student, looking to resolve a conflict between devotees of two other, more well-known New England universities, diplomatically mixed solutions of iron oxide (crimson,  $\text{Fe}_2\text{O}_3$ ) and copper sulfate (deep blue,  $\text{CuSO}_4$ ) to form Holy Cross’ signature color. Or perhaps it was derived from the color of ancient nobility. Whatever the origin, the college chemistry department keeps the crusade of science education alive and well.