

Joseph Marino helped to build the foundation for the next generation of innovation and discovery at the College of Science.



Tribute to Joseph Marino

THIS SUMMER, Joseph Marino ended six years as dean of the College of Science and returned to the life of a chemistry professor at Notre Dame. The legacy from Marino's term as dean is a cause for celebration and gratitude.

Notre Dame Science asked a number of his colleagues to recall highlights of strides that the College of Science made under the leadership of Dean Marino. The college and the scientific disciplines at Notre Dame have grown in size and stature—in their services to researchers, teachers, and learners alike—and in their ability and availability to make important contributions to the entire campus and the world. The college is now a better place for research, instruction, professional aspirations, and collaborations.

A Place for Research and Instruction

- Research expenditures consistently grew over 10 percent per year during his term.
- In FY 07, the college was awarded \$44 million in research funds, representing 53 percent of the University's total research awards. Charles Kulpa, chair of the Department of Biological Sciences, recalled, "Joe always supported our efforts to increase our research activities while maintaining the excellence of our undergraduate and graduate programs."
- Mitchell Wayne, chair of the Department of Physics and former associate dean of undergraduate studies commented, "He and the college made some excellent hires—some really high-profile people."
- The college began an annual event spotlighting and encouraging undergraduate research, noted former Associate Dean of Research Joseph O'Tousa. This helped

to inspire younger students. Now, the college has a coordinator for undergraduate research and offers a number of grants for summer undergraduate research and related travel.

- The number of science majors increased 18 percent during Marino's tenure as dean, adding 179 students to the college.
- The college began hosting an open house for early-admission students, recruiting some of the country's brightest young people to study science at the University of Notre Dame.
- Under Marino's leadership, the Jordan Hall of Science opened in the fall of 2006 as one of the best facilities for undergraduate science instruction in the nation.

A Place for Professional Aspirations

The Center for Health Science Advising, directed by Rev. James Foster, C.S.C., M.D., was created under Marino's watch to assist with the complex advising and medical school application process. The number of Notre Dame students applying to medical schools has increased, with the acceptance rate averaging 80 percent over the past five years, compared to the national average of 44.8 percent (2007). The center is one way in which the College of Science has guided all students applying to schools in the health professions, regardless of major. Marino has been strongly supportive of educating each student as a whole person, with sound ethics and a well-rounded perspective, says Foster. Such people, once trained as doctors, will "take care of the whole patient,"

he points out. Marino also has been "very supportive of students who are interested in the health professions"—including dentistry, veterinary medicine, pharmacy, and the allied health professions, says Foster. Growing numbers of students are expressing interest in these fields, as well.

A Place for Collaboration

The number of centers and institutes within the College of Science grew with Marino at the helm. The Interdisciplinary Center for the Study of Biocomplexity, the Center for Complex Network Research, the Center for Aquatic Conservation, and the Institute for Theoretical Sciences (attracting an international pool of top researchers to work at Notre Dame and the Argonne National Laboratory) are among the newest drivers for collaboration among diverse people and places.

Wayne, chair of the physics department, says he learned a lot working with Marino. The dean was consistently "concerned about what he felt was best for the University," he recalls. "Joe really cares about Notre Dame."

Joseph Marino helped to build the foundation for the next generation of innovation and discovery at the College of Science. The college is indebted to him for his leadership over the past six years.

Empowering Projects for Energy Innovation

THREE RECENTLY ANNOUNCED FUNDING commitments bolstering science and engineering research crucial to a more sustainable energy future are among the cutting-edge, cross-disciplinary collaborations in the College of Science.

All three projects are well-suited to the focus of the 2008 Notre Dame Forum and to the goal of extending the Forum's spotlight on sustainable energy across the whole campus and into the coming months and years. All three are receiving seed funding from the Energy Center, a three-year-old organization based in the College of Engineering that taps into expertise from many scientists and others to develop technological answers to the global energy challenge.

"It was interesting to see that the three winning proposals all involve aspects of converting solar energy into more usable forms" said Prof. Joan Brennecke, director of the Energy Center. "Obviously, the researchers recognize this as an area with many significant technical challenges and opportunities."

The first project explores converting light into chemical energy using transition metal oxides. Three professors—Steven A. Corcelli, assistant professor of chemistry and biochemistry; Kathie E. Newman, professor of physics; and William F. Schneider, associate professor of chemical and biomolecular engineering—are seeking to develop accurate and computationally efficient models that will predict chemical reactions at the solid-aqueous interface.

It is quite possible such models could one day provide guidance for researchers in the second project, which aims to advance hydrogen production using solar energy to split water. Prashant Kamat, professor

of chemistry and biochemistry, is working with Paul J. McGinn, professor of chemical and biomolecular engineering, to pursue more efficient photocatalysts for solar hydrogen production. This would allow for more widespread use of fuel cells, which have vast potential as a clean, efficient source of transportable, stored energy. McGinn is serving as interim director of the Energy Center while Brennecke is away during this fall semester.

The third project tackles another aspect of efficient use of solar energy, as it involves an investigation of the use of semiconductor nanostructures for capturing and using solar energy. This research team—Masaru (Ken) Kuno, assistant professor of chemistry and biochemistry, as well as Kamat—wants to grow conductive substrates for a new generation of solar cells. Photovoltaics made of low-dimensional materials could lead the way to low-cost, high-efficiency solar energy conversion.

Funding totaling more than \$113,000 went to these three projects in 2008 from the Energy Center's new Seed Fund Program. The program was designed to support innovative, early-stage research projects that address energy-related issues and could lead to externally sponsored research projects. A goal of the center is to nurture projects like these three, which complement research work already being done at Notre Dame and which could attract outside funding at a later stage.

Find out more about the Energy Center at energycenter.nd.edu.



Dean of the College of Science Greg Crawford enjoys driving the BP solar utility vehicle (SUV).

In mid-August, College of Science Dean Greg Crawford was excited to receive a solar utility vehicle (SUV) from BP America, Inc.—one of the largest investors

in alternative energy. BP's donation supports Notre Dame's commitment to the environment and to finding alternative sources of energy.

The solar vehicle is one of the most powerful all-terrain vehicles in its class. With 30 horsepower and over 170 pounds of torque, it is almost seven times more powerful than the average electric golf cart. BP Solar's 185 watt, photovoltaic solar panel augments the vehicle's battery charging system, giving it more operational range.

BP Alternative Energy, which was launched in 2005, combines all of BP's interests in wind, solar, hydrogen power with carbon capture and storage, natural gas-fired power generation, biofuels for low carbon transport, and distributed energy for emerging markets.

Several faculty members from the Notre Dame Energy Center are actively pursuing ways to increase the efficiency of alternative sources of energy, including solar power.

Cardiologist Vince Friedewald, M.D., in the Center for Health Sciences Advising, was instrumental in securing the donation.

The college has big plans for using the vehicle. In the meantime, Dean Crawford is looking forward to more sunny days.

