ENDOWMENT PURPOSE

The Donald G. Crosby Endowed Chair was established in 2010 through the estate of the late Dr. Charles (Charley) J. Soderquist in honor of his good friend and mentor, Professor Donald Crosby. Soderquist was an agricultural chemistry PhD student of Crosby’s in the 1970’s. The endowment supports a faculty member whose research is in the field of environmental chemistry, with a broad focus on the challenges related to the source, environmental fate, or consequences in the environment of chemicals that affect living organisms.

RESEARCH

My research program is focused on the fate and toxic actions of agricultural pesticides, petroleum hydrocarbons and oil dispersants in aquatic systems and organisms. Specifically, it is focused on the processes (reactions and rates) by which chemicals are degraded by either sunlight or microbes. The less persistent a chemical is, the fewer long-term problems it may present. My program is also focused on the use of traditional chemical tools, such as nuclear magnetic resonance spectroscopy (NMR), for the characterization of toxic actions. Coined “environmental metabolomics,” it is focused on elucidating biochemical responses to toxic chemicals in whole organisms under simulated natural conditions.

One key accomplishment of the Crosby Endowment has been to purchase via five-year payment plan a new departmental liquid chromatograph-mass spectrometer (LC-MS/MS) for use by all graduate students and postdoctoral researchers investigating the fate of chemicals of environmental importance. Installed in January 2013, it has already contributed to the research of over a half-dozen doctoral students representing at least three faculty mentors.

TEACHING

The course most closely related to the endowment is ETX 102A, "Environmental Fate of Toxic Chemicals." Developed by Professor Crosby in the 1970s, it is one of the core requirements for undergraduates majoring in environmental toxicology. In ETX 102A students are exposed to the many processes that govern the ultimate fate of environmental contaminants. Students also select a chemical of interest and develop a poster presenting its environmental fate, which they verbally present to the class during a poster session that is open to the entire department.
In addition, I continued as a team instructor for PTX 201, “Principles of Pharmacology & Toxicology I,” by presenting three lectures on chemical fate in the environment. I also presented lectures on pesticides for ETX 30, “Chemical Use and Abuse,” and aquatic toxicology for ETX 101 “Principles of Environmental Toxicology.”

To date the Crosby Endowment has contributed to the activities of at least five doctoral students and another five postdoctoral scholars investigating the environmental fate and toxic risk of various chemicals. Such research can aid in the management of anthropogenic chemicals to ultimately reduce their environmental impact.

Tessa Fojut (Postdoctoral Scholar) completed her research on the toxic risk of pesticides in agricultural runoff and is now an environmental scientist with the California Regional Water Quality Control Board. She has recently published several articles related to her research:


Monica Maier (Pharmacology & Toxicology) is currently investigating the environmental fate of the antibiotic azithromycin.

Rebecca Mulligan (Agricultural & Environmental Chemistry) is currently investigating the environmental fate of the insecticide clothianidin.

Anita Poulsen (Postdoctoral Scholar) is completing her research on the fate of pesticides in agricultural runoff and will join the faculty of Florida State University this summer.

Caitlin Rering (Agricultural & Environmental Chemistry) is currently investigating the environmental fate of the herbicide imazosulfuron.

Patrick Tomco (Agricultural & Environmental Chemistry) completed his research on the environmental fate of the herbicide clomazone and is now on the faculty of the University of Alaska, Anchorage. He has recently published several articles representing his dissertation research:


Kelly Trunnelle (Postdoctoral Scholar) is currently conducting research on the toxic risk of pesticides in agricultural runoff and preparing new risk assessment methods for pesticides in sediments.
April Van Scoy (Postdoctoral Scholar) completed her research on the fate of pesticides in agricultural runoff and is now an environmental scientist with the California Department of Pesticide Regulation. She has recently published several articles related to her research:


Martice Vasquez (Postdoctoral Scholar) completed her research on the fate of the pesticide rotenone following treatment of Lake Davis to eradicate the exotic northern pike and is now a supervising chemist with the California Department of Fish & Wildlife. She has recently published an article related to her research:


Katryn Williams (Agricultural & Environmental Chemistry) is currently investigating the environmental fate of the herbicide benzobicyclon.

**OUTREACH**

For some 25 years I have instructed three courses for UCSC Extension. NATSC 422.3, “Principles of Toxicology” and NATSC 424, “Environmental Fate of Pollutants” are required for the Certificate in Hazardous Materials Management; “Principles of Toxicology” is also required for the Certificate in Occupational Safety & Health Management, and both courses are electives for other certificates. NATSC 429.3, “Toxicology Basics for Biotechnology” is an elective for the Certificate in Biotechnology. Over the past year I have used endowment support to assist in the acquisition of resources to make all three courses available on the Internet. They now reach a larger audience of working professionals and are available year round.

I also continued to closely collaborate with scientists at the California Department of Pesticide Regulation, State and Regional Water Resources Control Boards, Office of Spill Prevention & Response and the California Rice Research Board on issues related to the environmental fate and toxic risk of agricultural pesticides, petroleum and dispersants. The Crosby Endowment provided matching funds to expand on important research questions.
Finally, in recognition of my quarter-century of research on the environmental fate and toxic consequences of marine oil spills, Chemical & Engineering News (American Chemical Society) published an extensive interview with me as a part of their article “Deepwater Consequences,” which was a review of the Deepwater Horizon Oil Spill three years later (C&EN, 91(22), 2013).

**UPCOMING ACTIVITIES**
In the coming year, I anticipate using the fund to continue to expand into the new area of pharmaceutical fate in the environment, as well as support current research activities focused on pesticide fate. In addition, the funds will be used to maintain the new departmental LC-MS/MS so that it remains fully functional and available to all departmental students working in the area of environmental chemistry.

In regards to new developments in the Department of Environmental Toxicology, two new adjunct faculty members have recently been welcomed aboard. Dr. Karen Riveres of CalEPA’s Office of Environmental Health Hazard Assessment (OEHHA) plans to instruct ETX 138 “Legal Aspects of Environmental Toxicology,” and Dr. Charlie Li of the California Department of Public Health is preparing to offer a new course in chemical food safety. Current Adjunct Professor George Alexeeff (also Director of OEHHA) is developing an advanced graduate-level course in risk assessment. With the contributions of both our Senate and adjunct faculty members, our department – the flagship program within the UC System – now offers the largest variety of courses in its nearly 50-year history.

**SPECIAL ENDOWMENT USE**
The following activities have been directly supported by the Crosby Endowment:

1. Purchase of the new departmental LC-MS/MS (per five-year installment plan).

2. Both Rebecca Mulligan and Katryn Williams presented research posters at the Annual Meeting of the Society of Environmental Toxicology & Chemistry (SETAC; November 2013), while Caitlin Rering presented a research poster at the Annual Meeting of the American Chemical Society (ACS; February 2014). The Crosby Endowment provided matching funds for poster preparation and travel costs.

3. Salary and supply support (in addition to grant funds) for all five students to conduct their dissertation research.

**THANKS**
Dear Chris: I want to again thank you and your family for the generous gift in the form of the Crosby Endowment. It has provided the opportunity to both enhance the activities of my doctoral students in environmental chemistry, and also enhance our department’s ability to support a wide range of students working in this area. In honor of both Professor Crosby and Charley, my goal is to continue utilizing the support to enhance such activities within both the department and the College. Very best wishes, Ron