NSF Awards Bennington College Grant to Expand Study of PFOA

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Bennington College Faculty Members David Bond, Janet Foley, and Tim Schroeder have been awarded a $300,000 National Science Foundation (NSF) grant to deepen and expand the College's response to PFOA contamination in New York and Vermont.

"Support from the NSF will allow Bennington College to do what we do best: confront the big problems of our time and put students and faculty to work crafting new insights and new solutions in real time," said **David Bond, the Associate Director of the Center for the Advancement of Public Action (CAPA) at Bennington College**.

PFOA was discovered last year in alarming concentrations in the groundwater of New York and Vermont. Once used in plastics manufacturing across the region, PFOA is now coming under increasing scrutiny as a widespread environmental toxin. Through new courses, new collaborations, and new research, this NSF-funded project—"Understanding PFOA"—will bring science education at Bennington College into conversation with unfolding local and national concerns about PFOA.

"This grant will allow us to more effectively apply the Bennington philosophy of learning by doing. Rather than just reading case studies of groundwater contamination incidents, our students will be actively investigating a local problem," said **Geology Faculty Member Tim Schroeder**. "Students will learn about the science of PFOA contamination and, by visiting impacted communities, also learn why science matters."

This project will equip a handful of science classes in chemistry, geology, and environmental studies at Bennington College to produce independent data on PFOA contamination.

“We are very excited to be able to follow up on strategies for involving students in the next phase of community involvement with the PFOA contamination in our area,” said **Chemistry Faculty Member Janet Foley**. “We hope to develop multiple mechanisms for students to engage in this issue, such as incorporating PFOA modules in our science classes, training students in GIS to develop visual mapping of data, and proteomic studies with yeast to explore the effects of PFOA from a molecular point of view. This issue is an opportunity for students to see that by integrating knowledge with real-life problems, they can make real changes in the world.”

Bond, Foley, and Schroeder are joined on the grant by Associate Professor of Chemistry Laura MacManus-Spencer of Union College.

“This project will provide a crucial home base for the growing network of research scientists and science educators in our region concerned about PFOA,” said **MacManus-Spencer**. “From university laboratories to high school classrooms, this project will help organize and apply the scientific resources of our region to the urgent questions being raised about PFOA by local residents.”

This project also teams up with the New York State Department of Environmental Conservation (NYS DEC) and the Vermont Department of Environmental Conservation (VT DEC) to share research projects and findings on PFOA across state borders.

In many ways, PFOA represents a new kind of environmental problem. Once a key ingredient in the manufacture of high-performance plastics

like Teflon, PFOA is now coming into focus as a subtle environmental toxin since low-level exposure has been correlated to a number of adverse health effects. PFOA resists natural degradation, is chemically stable in water for nearly a century, is highly mobile once released into the environment, and is readily absorbed by the body when consumed, where it is unsafely housed for 3–5 years.

Although PFOA was voluntarily phased out of manufacturing in the US in 2015, a tremendous amount remains in the environment. The Environmental Working Group estimates that over 5 million Americans currently rely on drinking water with harmful levels of PFOA. As the EPA summarizes, “the toxicity, mobility, and bioaccumulation” of PFOA poses difficult questions for safeguarding human health in areas where it has been released into the environment.

“Bridging local questions about PFOA contamination with the analytic resources and manpower of the science classroom, this project showcases the civic value of science in times of new environmental challenges and toxic uncertainties” **Bond said**. “It promises a new educational model for colleges and universities to respond to nearby environmental problems.”

This current grant builds on **a previous RAPID NSF grant** Bennington College received in March of 2016. As PFOA was discovered in Hoosick Falls, NY in 2015 and in Bennington, VT in 2016, Bennington College designed and offered a new course on the chemical properties, environmental pathways, and policy concerns surrounding PFOA. Alongside Bennington students, this class was opened to high school teachers, nurses, local journalists, and community members from Hoosick Falls and Bennington. This class was offered as a primer on PFOA that could equip students and citizens alike to better navigate the

very complicated science of PFOA, to produce data more attuned to local concerns, and to demand better protections for water resources moving forward. This additional NSF support will enable Bennington to continue offering this course once a year for three years.

In the course, students also learned how to produce and interpret original data on PFOA contamination. Taking public concerns around PFOA as analytic prompts, students and faculty designed research projects that could produce independent data to answer community questions. For example, residents asked if there might be any PFOA in local maple syrup. After tapping two trees within one mile of a former plastics plant, laboratory analysis found low levels of PFOA in the maple sap (about 8 ppt). Other residents asked if there might be any residual PFOA in the water pipes of their home, which are located after the carbon filtration system and thus might be a continued source of PFOA exposure. Laboratory analysis found no detectable PFOA in water sampled from the kitchen faucet in homes in Hoosick Falls and Bennington with private wells that have high levels of PFOA.

Many local residents also expressed concern about highly divergent readings among immediate neighbors—the well of one house has alarming levels of PFOA while the well of the house next door does not have detectable levels. Monitoring two neighborhoods with divergent readings over the course of one year has not revealed a coherent pattern: analysis has indicated significant fluctuation in one neighborhood and relative stability in another. Continued NSF support will enable Bennington College to continue monitoring these neighborhoods as well as continue using the scientific resources of the college to help answer new community concerns.

Bennington College's pioneering response to PFOA contamination has garnered national attention. In addition to local and national media coverage of the project, Bond, Foley, and Schroeder have given invited presentations on their work engaging PFOA to environmental scientists and faculty at University of Massachusetts Amherst, Northeastern University, and Williams College, as well as to environmental policymakers and elected officials in Vermont, New York, and Massachusetts. They've also given numerous presentations to residents and local leaders in Hoosick Falls, NY and Bennington, VT. In May 2017, Bennington College also hosted a conference of 150 regional high school students and teachers to learn more about engaging PFOA in an AP science classroom.

About Bennington College and the Center for the Advancement of Public Action

Bennington College is a small liberal arts college in southern Vermont with a long tradition of engaging the humanities in the contemporary world. The Center for the Advancement of Public Action (CAPA) at Bennington College is furthering the educational philosophy and pedagogy of the College by connecting classroom learning to hands-on engagements with a wide range of current issues like international conflict and leadership, art in the public realm, incarceration in America, and, increasingly, our region's food, energy, and water systems. Founded in 2011, CAPA teaches the essential capacities needed to develop an educated and emboldened citizenry. Drawing together the deep artistic and analytic resources of Bennington College and collaborating with existing public and private organizations, CAPA

leverages the classroom as a new kind of laboratory for creative problem solving and innovation.