Purdue to continue review of 'bubble fusion' research

May 11 2007

A congressional subcommittee has asked Purdue to continue looking into allegations of misconduct related to sonofusion research in the university's School of Nuclear Engineering.

In a letter sent Wednesday (May 9) to Purdue President Martin C. Jischke, Rep. Brad Miller, chairman of the Subcommittee on Investigations and Oversight of the U.S. House Committee on Science and Technology, said that allegations against professor Rusi P. Taleyarkhan require a more thorough investigation than Purdue has done to date. Miller asked that the university provide the subcommittee with a report on an additional inquiry that Purdue began earlier this year.

"Purdue is a premier research and educational institution," Miller said. "One of its goals is to teach the importance of scientific integrity to its students and future scientists. I sincerely hope that the next inquiry will be conducted in a manner worthy of your great institution."

Purdue officials said Thursday (May 10) that the university understands and intends to address fully the concerns expressed in Miller's letter and in a subcommittee staff memo that details the congressional panel's conclusions.

"Purdue has worked closely with Congressman Miller's subcommittee and his staff in order to provide full access to the university's review of the allegations of misconduct," Jischke said. "The congressman and I have discussed how Purdue should go forward and have together

identified steps for the next stage of Purdue's review process. At his suggestion, Purdue will add one or more outside scientists to the panel of Purdue scientists who have agreed to serve as reviewers during the next stage. Our procedures for resolving questions of scientific integrity ultimately must rely on the judgment of scientific peers.

"While there are characterizations in the subcommittee staff report that we could debate, it is not productive to do so now in the midst of our continuing inquiry."

Purdue Provost Sally Mason said the university began a new review related to sonofusion (also known as bubble fusion) shortly after announcing in February that a faculty committee had decided that the evidence it reviewed was not sufficient to support a finding of research misconduct against Taleyarkhan. The committee recommended that the university not proceed with a full investigation.

"Following that announcement, Purdue received additional allegations related to sonofusion and has begun an inquiry of them," Mason said. "Under our policy on integrity in research, we began this new review in confidence, and we will endeavor to keep the committee's activities confidential until we make our report to Congressman Miller's committee.

"Purdue intends to be fully responsive to the concerns expressed by Congressman Miller. We have made every effort to address honestly and thoroughly the allegations in this matter. We are in the midst of a very difficult and complex process, and there is much work to do. I accept responsibility for completing that work. As the chief academic officer of Purdue, I value nothing more highly than the integrity of my university. We will proceed systematically and fairly, and in the end, we will take whatever action is dictated by the evidence."

Joseph Bennett, vice president for university relations, said Purdue also has recently sent open-ended requests to potential witnesses, asking them to make a full and complete written disclosure of any misconduct they may have witnessed in sonofusion research at the university.

"Purdue makes an open call for witnesses to submit their evidence in writing to President Jischke, regardless whether they have received a direct invitation from the university," Bennett said.

Taleyarkhan, a professor of nuclear engineering at Purdue, first reported creating the "bubble fusion" phenomenon at Oak Ridge National Laboratory where he was a distinguished scientist. A paper on the team's findings was published in 2002 in the journal Science. Those researchers later conducted additional research at Oak Ridge, Rensselaer Polytechnic Institute and the Russian Academy of Sciences before Taleyarkhan came to Purdue in 2003 to continue his research. In March 2004 and January 2006 his group published its second and third papers on this subject.

Scientists have long known that high-frequency sound waves cause the formation of cavities and bubbles in liquid, a process known as "acoustic cavitation," and that those cavities then implode, producing high temperatures and light in a phenomenon called "sonoluminescence." Researchers have estimated that temperatures inside the imploding bubbles reach 10 million degrees Celsius and pressures comparable to 1,000 million earth atmospheres at sea level.

Nuclear fusion reactors have historically required large, expensive machines, but acoustic cavitation devices might be built for a fraction of the cost.

"The Purdue administration cannot answer the ultimate question whether sonofusion works," Bennett said. "Only honestly conducted and reported

laboratory research and debate in the scientific community can answer that question. From the outset, Purdue has affirmed its strong commitment to do its part to support the integrity of the sonofusion debate by addressing any alleged breakdown of integrity in sonofusion research at Purdue. The university certainly cannot address the circumstances under which Dr. Taleyarkhan's work at Oak Ridge was conducted and reported."

Bennett said Jischke has given Congressman Miller an update on Purdue's ongoing leadership initiatives for oversight of research on a laboratory-by-laboratory basis. In addition, Bennett said, Purdue earlier this year began a major revision of its policy on research integrity. That revision will incorporate the latest guidelines from the federal Office of Research Integrity and will improve procedures for addressing research misconduct allegations, he said.

Source: Purdue University