



SCIENTIFIC MISCONDUCT

New Purdue Panel Faults Bubble Fusion Pioneer

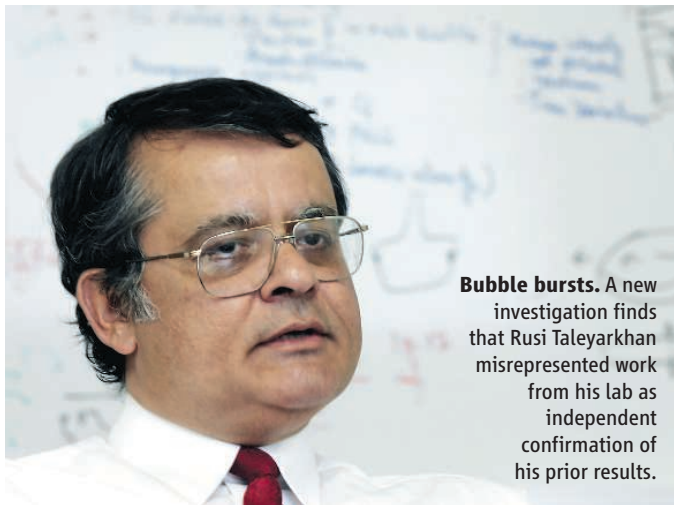
The third time was no charm for Rusi Taleyarkhan, the “bubble fusion” pioneer at Purdue University in West Lafayette, Indiana. After two previous investigations looked into alleged scientific misconduct by Taleyarkhan, a third panel has now cited Taleyarkhan for two cases of misconduct. Both cases centered on efforts by Taleyarkhan to make experiments carried out by members of his lab appear as independent verification of his previous work.

Taleyarkhan first sparked controversy after he and colleagues reported in *Science* in 2002 that they had generated nuclear fusion with a simple tabletop setup. Fusion, the process that powers the sun, normally takes place at pressures and temperatures intense enough to cause atomic nuclei to combine and give off energy in the process. Decades’ worth of efforts to harvest energy from that process in reactors on Earth have failed. In their original *Science* paper, Taleyarkhan, who was then at Oak Ridge National Laboratory in Tennessee, and his colleagues reported that firing a pulse of ultrasound and neutrons at a cylinder of acetone in which the hydrogen atoms had been replaced by deuterium atoms caused bubbles to form, swell, and collapse. The heat and pressure at the center of the collapsing bubbles reportedly fused deuteriums together, liberating nuclear byproducts and excess energy.

The work raised the promise of limitless energy and spurred numerous early attempts to replicate it, all of which failed. Taleyarkhan moved to Purdue in 2004 and set about reproducing the original bubble fusion results. That winter and spring, according to the panel’s report, Taleyarkhan’s postdoctoral assistant Yiban Xu conducted bubble fusion experiments and wrote up the results, which were submitted to *Science*. The paper was rejected and later resubmitted to *Physical Review Letters*. *PRL* too rejected the paper; according to the panel’s report, a reviewer commented that it was “unusual” that the experiment was done by one person “so that needed crosschecks and witnessing of results seem lacking.”

In early 2005, Taleyarkhan asked Adam

Butt, a master’s degree candidate in his lab, to proofread the paper and check some of its numbers. After Butt did so, the panel says his name was added as an author of the paper, which was then submitted to *Nuclear Engineering and Design (NED)* and quickly accepted. “In this context, it is plain that the intent was to create the appearance of a joint author who participated in the experimentation itself,” the panel’s report concludes. “This is research misconduct.” The panel flagged Taleyarkhan for a second



Bubble bursts. A new investigation finds that Rusi Taleyarkhan misrepresented work from his lab as independent confirmation of his prior results.

count of misconduct for a 2006 *PRL* paper in which Taleyarkhan and colleagues cited the *NED* paper as proof of independent confirmation of bubble fusion. Although the panel concluded that several other allegations did not constitute scientific misconduct, the report was still deeply critical of Taleyarkhan’s behavior and in some cases his scientific procedures.

In an e-mail to *Science*, Taleyarkhan says that the new report “is flawed from various perspectives and incorporates factual errors,” though he does not spell them out. He adds: “The current state of matters represents a major setback for university faculty members in general—this sort of selective victimization to meet political-funding priorities of a huge institution (with relatively incomparable resources vs the sole individual) could happen to any other faculty member.”

Kenneth Suslick, a chemist at the University of Illinois, Urbana-Champaign, and a longtime critic of bubble fusion, calls the report “some kind of vindication.” Suslick says he was disappointed the report didn’t more squarely address questions of possible scientific fraud that have been raised about the research (*Science*, 17 March 2006, p. 1532). The report states that although such allegations were made to a previous panel investigating Taleyarkhan’s work, they were not forwarded

to be made part of the current panel’s investigation—but it does not explain why. The current report also did not attempt to evaluate the original scientific results behind “bubble fusion.”

The latest panel was set up in March 2007 following complaints to the Inspector General of the Office of Naval Research (ONR), which helped fund some of Taleyarkhan’s experiments.

The panel was chaired by Purdue biochemist Mark Hermodson, and four of its six members came from outside Purdue University. Although the current panel submitted its report to ONR in April, it was formally accepted and made public only on 18 July.

Taleyarkhan’s lawyer, John Lewis of Lewis and Wilkins LLP in Indianapolis, says Taleyarkhan plans to appeal the report’s findings. However, he adds that he is “not optimistic” the appeal will succeed, given that it will be conducted by the university. Purdue spokesperson Joseph Bennett says that Purdue officials will not comment on the report until after any appeal is complete next month. The ONR letter states that the funding agency will keep the case open until Purdue takes corrective action to prevent similar occurrences in the future.

—ROBERT F. SERVICE