

Science labs, too, 'cooking the books'

Fraud charges against several prominent scientists have sparked inquiries and new ethics rules.

By Peter N. Spotts | *Staff writer of The Christian Science Monitor*

For more than 75 years, Bell Labs has been a scientific Camelot.

Its scientists and engineers invented the transistor and the laser. They were the first to hear the faint echoes from the Big Bang. In all, work at the Murray Hill, N.J., facility has earned six Nobel Prizes.

Now, however, an independent team of scientists is investigating whether one of the center's brightest stars, Jan Hendrick Schön, fabricated results in what many considered to be groundbreaking experiments.

His case is one of several that have come to light recently, shining a harsh light on one of the darker sides of science – fudged research results. While recent attention has focused on the ethics of business executives, similar concerns have surfaced in the scientific community, with potentially far-reach implications of their own.

At best, "cooking notebooks" can send other scientists down experimental dead ends, wasting time and precious research money. At worst, scientific misconduct has the potential to foster poorly designed environmental rules or public-health regulations. In the case of biomedical research, misconduct could cost lives.

Last week, news reports revealed that a prominent scientist fabricated the results of a highly publicized 1999 experiment at the Lawrence Berkeley Laboratory in Berkeley, Calif. The experiment, which supposedly led to the discovery of two new chemical elements, was touted by then Energy Secretary Bill Richardson as "a stunning discovery" that would pave the way for new insights into atomic nuclei. The physicist tagged with the fabrication, Victor Ninov, was a highly regarded expert on the nuclei of heavy elements. He was fired and is fighting his dismissal.

The cases at Bell and Lawrence Berkeley labs are unusual, researchers say, because they involve high-profile experiments in a field traditionally thought to be relatively free from misconduct. "We assumed we were immune from this because you were sure to be caught," says University of Maryland physicist Robert Park, author of "Voodoo Science: The Road from Foolishness to Fraud." Now, he sighs, "It looks so much like what's going on with the accounting industry. Every day it's a new revelation."

Although scientific misconduct is as old as science itself, analysts disagree about how frequently it occurs.

Those who argue that it's rare say the discipline's self-correcting mechanisms, like the anonymous peer-review process, discourage fabricated, falsified, or plagiarized results. But others say publicized cases of scientific misconduct are only the tip of the iceberg. Surveys have indicated that scientists often are aware of misconduct in their labs but fail to report it. Research also shows that small but significant numbers of graduate students and postdoctoral fellows would be willing to fudge or ignore data if it helped them land research grants or publish a paper.

"I suspect that there is a lot of fraud on less important papers" because few scientists are likely to follow up on them, Dr. Park says.

"The simple fact is we just don't know" how widespread scientific misconduct is, says Dr. Steneck.

Factors that can lead to the publication of fudged data include: pressure on university researchers to "publish or perish;" the tendency of prominent scientists to feel they can get away with cutting corners because few will challenge their results; the vested interest scientists reporting spectacular results have in defending their work regardless of flaws; the tendency of busy peer-reviewers to scrutinize papers only for obvious flaws; and competition by major science journals to publish the hottest cutting-edge results.

The consequences of fudged data can range from the intangible – embarrassment for labs and erosion of public confidence – to the concrete: questionable public policy decisions and exaggerated results from medical trials, for example.

Last October, the US Department of Health and Human Services' Office of Research Integrity announced that it had successfully closed a case against Tulane University scientist Steven Arnold for falsifying and fabricating data in a study involving industrial chemicals that mimic estrogen. Dr. Arnold admitted that he had no evidence to back the conclusions in his paper; it was withdrawn in 1997, but is said to have played an important role in the US Environmental Protection Agency's 1996 decision to screen chemicals for endocrine disrupters.

Given the wide disparity in estimates of scientific misconduct, Steneck says, it's hard to develop policies to combat it.

Still, efforts are under-way, both at the federal level and at local universities, to set clear guidelines for ethical research behavior. Federal agencies are in the process of adopting guidelines written in 2000 by the White House Office of Science and Technology Policy. The Office of Research Integrity also has several initiatives under-way that focus on educating researchers about lab ethics.

On Monday, the Institute of Medicine in Washington released a report on integrity in science that made several recommendations for reducing the incidence of science fraud: that federal agencies fund research into the issue of scientific integrity and how it can be assessed; that research institutions set up their own programs to promote and monitor research integrity; and that universities and labs beef up research-ethics education.