Critical Point Tale of two anniversaries

Modern scientific laboratories face not only scientific but also social challenges, argues **Robert P Crease**

Measured in terms of Nobel prizes, the Brookhaven National Laboratory can claim to be one of the most successful scientific labs ever built. A total of 10 researchers who used the lab's facilities went on to become Nobel laureates, sharing six Nobel prizes among them. Five of the prizes were for physics: the theory of parity violation and the discoveries of the muon neutrino, the J/ψ particle, charge–parity (CP) violation and the fact that the number of neutrinos emitted by the Sun is less than that predicted by theory. The other Nobel was for cell chemistry.

Located on Long Island about 100 km from New York City, Brookhaven opened in 1947 as one of the first three US national labs, the others being Argonne and Oak Ridge. All were designed to operate facilities too big for single institutions, even large universities, to support. At Brookhaven, these facilities included the Graphite Research Reactor and the High Flux Beam Reactor (HFBR), as well as several accelerators, including the Cosmotron, the Alternating Gradient Synchrotron and the Relativistic Heavy Ion Collider.

This year Brookhaven celebrates two anniversaries, each illustrating a different challenge facing modern scientific institutions. One is the lab's 60th anniversary. Being at the forefront of science for so long has not been easy. Brookhaven has periodically had to reinvent itself and revise its fundamental priorities in response to changing scientific developments. Its initial focus on reactor research was subsequently redirected to high-energy accelerators, and later to heavy-ion physics, synchrotron radiation and supercomputing.

The other, less happy Brookhaven anniversary is one that thrust a second challenge on the lab, and one with a complex social dimension. A decade ago Brookhaven announced that it had found a leak of slightly radioactive water in wells near the spent-fuel pool of the HFBR, the centrepiece of its solid-state physics programme. The leak did not affect drinking water and was not a health hazard. Scientists assured the public that the groundwater was safe and that the lab posed no health hazard to the community.

Some members of the media, however, yearned for another Watergate, in which they could heroically expose the illegal cover-up of a dishonest government agency. Others wanted a repeat of the story of the book and movie *A Civil Action*, in which the actions of a corrupt, neighbourhood-polluting company trigger a successful lawsuit. The Brookhaven story was neither – but false rumours circulated of high cancer rates in towns near the lab that were hard to dispel and even to address. The outcome was the firing of Brookhaven's contractor 10 years ago this month, the shutting down of the HFBR in 1999, and even calls to close the entire lab itself (*Physics World* May 2003 p19).

Brookhaven National Laboratory

Sign of the times This year the Brookhaven National Laboratory marks two quite different anniversaries.

Brookhaven has periodically had to reinvent itself and revise its priorities

The climate of distrust seemed to legitimitize the most flagrant accusations against the lab, some of which continue today. One example is an opinion piece that Kelly McMasters – an adjunct professor of creative writing at Columbia University – published last November in the *New York Times*. She accused the lab of contaminating her home town (even though the local department of health has found no wells to be contaminated), mentioned a "cancer cluster" around the lab (though this is not substantiated by studies carried out by New York State), and demanded that the lab's reactors be shut down (even though they had already been shut down years ago). McMasters, it seems, is writing a book about growing up in her supposedly threatened home town.

Social Iagos

Brookhaven's second, social challenge – which, like the first, remains unabated – was to cope with this atmosphere of distrust and foster honest discussion about environmental safety. A major obstacle is that some people profit by promoting distrust.

Shakespeare gives the classic example of self-advancement through trust disruption in the play *Othello*. Denied a position of authority he craves, Iago cultivates distrust between his leader Othello and Othello's wife Desdemona. Eventually Othello no longer believes in Desdemona's fidelity, despite her honest denial of the charges, and kills her.

Society, too, has its own Iagos – people or groups that advance their agendas using dire predictions and false claims to foster unwarranted distrust between communities and institutions. Social Iagos can be politicians seeking votes, celebrities coveting moral status, pseudo-environmentalists wanting publicity, and citizens posing as innocent victims to obtain government money, sell books or achieve notoriety. All have reasons to keep alive hopes of another Watergate, another *A Civil Action*.

To meet this ongoing challenge, Brookhaven made more explicit its commitment to environmental responsibility, and established a community forum that included some of the lab critics. The HFBR's closure also helped; although the facility was deemed safe by scientists and a government review panel, it was a focal point for community fear. Local politicians and the media (some of them, anyway) began to scrutinize accusations against the lab as carefully as they did statements from the lab itself.

The critical point

Brookhaven's challenge of remaining flexible in a changing scientific landscape will continue. So will the social challenge of fostering honest discussion of responsible environmental conduct in a climate that not only includes voices seeking to disrupt trust, but that to some extent nurtures and encourages them. Social Iagos threaten to obstruct our ability to distinguish between real and fake threats to the community, and therefore pose a direct and significant social threat. They give rise to an amplified version of the danger of crying "Wolf!".

Brookhaven's experience in meeting this social challenge offers valuable lessons in how trust is lost, how it is regained, and how it is maintained – and is another of the lab's contributions to science. For every major scientific facility will face this challenge in the coming century. What is at stake in meeting this social challenge is much more than science – it is the health and robustness of society itself.

Robert P Crease is chairman of the Department of Philosophy, Stony Brook University, and historian at the Brookhaven National Laboratory, US, e-mail rcrease@notes.cc.sunysb.edu