



# Taking the High Road

BY ALISSA POH

Like most technologies that produce reams of information, high content screening necessitates finding ways to efficiently manage and analyze large, image-intensive data sets. At Bristol-Myers Squibb (BMS), researchers decided to handle HCS separately. They designed and built HCS Road, a specific data management system that won *Bio-IT World's* 2010 Best Practices award for IT and Informatics: HPC.

BMS now employs HCS along differ-

## IT & Informatics: HPC

**Winner:** Bristol-Myers Squibb, Research & Development

**Project:** High Content Screening—Road

ent stages of its drug discovery process, but the company took some time to fully implement this technology, says James Gill, one of the company's directors and leader of the HCS Road project. "We don't tend to jump whole-hog into something until we're certain it can pay back," Gill says. BMS began with one HCS instrument, then, noting that the industry was growing quickly and different instrument vendors had very diverse capabilities, gradually expanded its fleet.

At that point, Gill's team recognized that "the informatics [component] was actually impairing our ability to explore the science. So we were awarded some financing to build what we originally called HCS Footpath, and that helped our

(L to R) James Gill and Mohammad Shaikh, Bristol-Myers Squibb

science community to really button down on [using] the technology." Later, the decision was made to forge a single resource for all of BMS's HCS data—basically, expanding the footpath to a road.

"HCS Road starts by collecting details about an experiment—type(s) of cell line(s), dyes, fluorescent antibodies, what aspect of biology is being tracked and so on, tying all this information into our existing database and reagent inventory," explains Donald Jackson, a senior research investigator at BMS. The information is then linked with data from HC imagers (often several different vendors). With all this in place, HCS Road is able to readily define experiments, normalize and analyze data, produce assay performance reports, and store all results in a relational database.

"Our scientists can go straight to understanding what happened in any one experiment, instead of having to deal with the whole process of managing the data," Jackson says.

Prior to HCS Road, BMS used two different solutions for handling HCS data; those working in high-throughput screening used existing tools for *in vitro*

enzyme assays and the like, while those in genomics used a system originally put together for examining microarray data. "Folks in genomics were saying, 'Hey, we need to calculate IC50s,' while scientists in the screening group said, 'We need to be able to cluster our results and identify patterns of activity,'" Jackson remarks. HCS Road has now solved those communications headaches.

HCS often means rapid burgeoning of a company's databases. "As the size of our databases grew, performance deteriorated," says Mohammad Shaikh, one of BMS's associate directors. "Managing cell-level data is of a very different scale than, say, [financial] trading systems, and it was a challenge to find a solution where both scale and performance could be addressed."

HCS Road makes use of Oracle's relational databases for storing results. So BMS decided to address this informatics issue through Oracle's data partitioning capabilities, albeit with some refining. Shaikh says, "We added our own partitioning scheme to their technology, and shared the end product, BioOracle, with them." BMS aims to expand HCS Road so it can support other in-house systems that lack the equivalent software available for HCS data.

Shaikh says the team saw the Best Practices competition as "a good opportunity to put all our [previously published] pieces on data storage and management together, presenting it as a comprehensive solution."

"In early drug discovery, the enemy is really the disease, not the competition," Gill adds. "We think it's very important to share what we've developed that's non-competitive, and we hope it helps to foster better tools from other vendors, more closely directed to what [pharma] needs." •

