

The ten most exciting tools to hit the life sciences in 2009.

It's been a tough year for every industry, and the life sciences are no exception. Yet companies and academic laboratories across the globe have developed innumerable new products designed to take your research to the next level. But with many lab budgets tighter than last year, which technologies are worth the investment?

That's why, for the second year in a row, we have gathered a panel of expert judges to pick the year's best innovations to hit the life sciences market in the past year. This year's winners run the gamut from imaging, genomics, and other tools that stunningly capture both intracellular and extracellular processes. Our judges—Steven Wiley, Jean Wang, Shawn Levy, and David Piston—are all known for pushing the technical boundaries, and have collectively published more than 600 academic papers.

It may have been a tough year for industry in general, but it was a great one for life science innovation.

Quick pathogen ID



Image Courtesy of Abbott Laboratories

When facing an outbreak of an unknown, deadly pathogen, any delay costs lives. So in the 1990s, during a government-run meeting on biodefense, David Ecker was disappointed by the best ideas being offered for pathogen detection. “They were talking about the Gram stain,” Ecker recalls.

At the time Ecker, at Ibis Biosciences, had been using mass spectrometry to test drug candidates for their ability to bind to RNA, by comparing the atomic weight of a bound RNA to an unbound (lighter) molecule. He figured, why not use the tool to identify genomes based on their different weights? “If we could measure a small molecule sticking to a nucleic acid, I could just measure a nucleic acid.”

The trick was to design PCR primers for conserved areas in a viral or bacterial genome, making them universal for an entire class of pathogens. The part of the genome sandwiched by the primers and amplified by PCR would be variable enough to distinguish a particular strain and subtype within each class of pathogen.

While it hasn't been approved for clinical trials or diagnostics yet, the machine is being used for testing basic mutation rates in viruses, forensics, and other applications, including being used by the U.S. Navy and Centers for Disease Control and Prevention to identify the new H1N1 virus.

After their acquisition by Abbott Laboratories late last year, Ibis and Abbott engineers designed a sleeker version of the machine called the PLEX-ID, which the *Wall Street Journal* dubbed the Innovation of the Year. The tool costs more than \$100,000, and \$30-\$40 per sample.

PISTON: This automated molecular "canary" combines genetics, robotics, spectroscopy, and informatics to greatly accelerate the identification of unknown diseases, and early detection is always important.

WANG: High-throughput detection of infectious agents is a timely development in light of the continuous threats from pandemic agents.