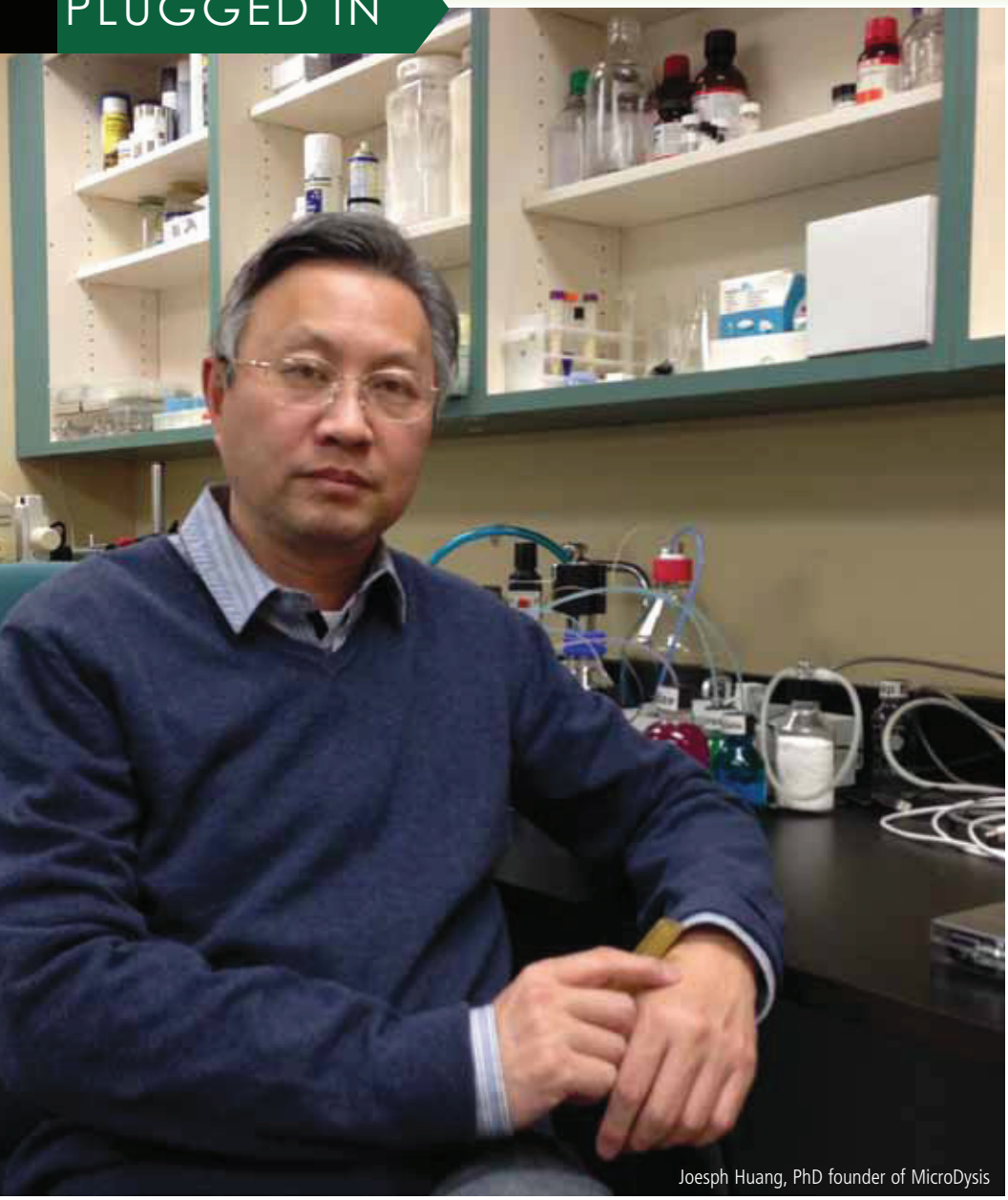

Joesph Huang, PhD founder of MicroDysis

Microfluidic Desktop Device

BY MICHELE HUJBER

DNA synthesis is becoming and will continue to be a crucial technology that has a major impact on molecular biology. Current technology is unable to synthesize DNA in long, continuous strands. They have to be made short (oligonucleotides, short, single-stranded DNA) and pieced together, which is time consuming and error prone.

Many U.S. drug developers and biomedical researchers engage the services of contract research organizations (CROs) or contract manufacturing organizations (CMOs) to carry out this work. These companies are located in countries where cheap labor is available, including India and China. However, many pharmaceutical companies have discovered that their lack of control during synthesis can lead to costly errors that negate the cost savings of outsourcing. Now, major U.S. pharmaceutical companies are reverting back to handling this work in-house.

MicroDysis, a startup company located in the Rutgers EcoComplex incubator, has been developing innovative products for biomedical applications. The new product is a laboratory desktop device for oligonucleotide synthesis. The device, which looks like a color inkjet printer, creates oligonucleotide strings in a microfluidic chip according to

Will Bring DNA Synthesis Back Home

customer designs and gives researchers at pharmaceutical companies and universities a low-cost, high-control and timelier alternative to CROs and CMOs.

The device was developed by Joseph Huang, Ph.D., founder and president of MicroDysis. Huang has an impressive reputation in both China and the United States. While working as an associate professor in biomedical engineering at China's Sun Yat-sen University, Huang was a major co-inventor for Enhanced External Counterpulsation (EECP) Therapy system. The patent for this device was bought by the U.S. company Vasomedical, in 1993. The EECP system is now the leading product in the U.S. in the non-invasive treatment of cardiovascular disease. Huang also received investment money for a contraceptive device that was approved by the Chinese counterpart of the U.S. Food and Drug Administration and received a prestigious award from the Chinese government for his work.

Huang's success in China spurred his desire to invent and innovate in the U.S., where he relocated in 1997. He worked for a few years at the University of Pittsburgh, the University of Virginia, and a small biotechnology company, PharmaSeq, in New Jersey. Then in 2003, inspired by the successful completion of the Human Genome Project, Huang founded MicroDysis.

Because the MicroDysis biochip is designed on a microfluidic platform, the device requires smaller samples and lower concentrations. It offers a flexible, easy-to-use, and highly sensitive, yet less costly detection approach for immediate laboratory applications and future clinical diagnosis. The New Jersey Commission on Science and Technology (CST) funded his first project in 2006, through which he developed a microfluidic chip for genetic and proteomic analysis. With additional support from the NIH National Cancer Institute's SBIR program in 2008, MicroDysis developed nanotechnology that used carbon nanotubes to increase the sensing surface area about 10,000 times, thereby vastly increasing the sensitivity of the device.

The U.S. economic downturn that started in 2008 hit hardest in 2010. There would be no more funding from CST. At the same time, funding for the Rutgers EcoComplex declined. Although the economic downturn slowed Huang's work on the former project, MicroDysis prevailed. In 2008-2009 MicroDysis made a chemical reaction and synthesis machine for the US Army's Picatinny Arsenal. Other contracts in 2010-2011 to develop customized equipment and devices for biotech and startup companies helped keep MicroDysis afloat and its research projects active.

The years 2008-2010 may have been tough economically but they also brought recognition to Joseph Huang and MicroDysis. The New Jersey Small Business Development Center awarded him the 2008 Success Award; the ninth annual joint symposium of BioNJ and Pennsylvania Bio named him one of 9 (out of 52) Innovation Corridor poster winners in 2009; and The Research and Development Council awarded him the 2009 Thomas Alva Edison Patent Award for the U.S. patent "Microstructure Fabrication and Micosystem Integration."

The development of the desktop oligo synthesizer may have been delayed by hard economic times, but it has continued. Since 2010 MicroDysis has also developed functionalized porous membranes for solid phase supports of oligonucleotide and peptide synthesis. The newly designed synthesizer carries out a series of chemical reactions in a microfluidic chip, adding DNA base by base until the desired sequences are produced in a massively parallel fashion within a few hours. Huang is now at the finish line: a prototype and its results have been validated. The new device will be on the market in March or April 2013.

For more information about MicroDysis, visit their website at http://microdysis.com, email contactus@microdysis.com or call (609) 642 1184.

MicroDysis is located at the incubator at the Rutgers EcoComplex, which is a member of the New Jersey Business Incubation Network. For more information about the EcoComplex, visit http://ecocomplex.rutgers.edu. For more information about the New Jersey Business Incubation Network, visit www.njbin.org. ■

Q: What changes are on the horizon with US and International financial reporting that will affect Life Science companies?

A: The most significant changes to accounting standards that are on the horizon for the next few years relate primarily to the convergence of US and International Financial Reporting Standards. The regulatory agencies (FASB and IASB) have been working diligently to eliminate the major differences between these two frameworks for several years. In many cases, the final standard agreed upon is a new standard which is not the original standard of either agency. In doing so, it is believed that the best standard is developed as one that represents the needs of users from all countries. Most notably for life science companies will be changes in accounting standards related to revenue recognition, leases, and financial instruments. Financial instruments and leases continue to be in draft form and will likely be reissued in another draft based on additional modifications before the final standards are released.

The final standards on revenue recognition are expected to be released by the summer of 2013. Last year, the second draft of these standards was issued and more closely resembled existing US standards, but certain changes are anticipated that will affect life science companies. These companies will be expected to make more estimates and use more judgment than is currently required. Specific sectors that will require additional focus will be in the areas of identifying performance obligations, determining if separate obligations are distinct from other services, and the identification of variable consideration in a transaction. Depending on the specific circumstances, revenue may be deferred into future periods. It will be important for life science companies to be well versed in the final standard when it is released as contractual terms may impact revenue recognition differently than in the past.

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