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The New Boom Town

The Optics Valley of China has a long history of optics development, but recent activity has established the region as a photonics leader.

By Beth Kelley

Six years ago China declared Wuhan's Optics Valley the country's new premier spot for optoelectronics and optical communications development, and set the goal to become a leading optoelectronic and information technology base in China. Today, the area has developed into a force not just in China, but throughout the world of optoelectronics and telecommunications.

The Optics Valley of China (OVC) is located in Wuhan, which is the capital of the Hubei province and the largest city in central China, with a population of over 7 million. The city has a long history as an industrial and commercial hub, and is the communications center for the seven provinces in southern China.

The entire OVC is a 132-km^2 area located within Wuhan, and encompasses most of the city's universities and technology companies. Often referred to simply as a neighborhood, it is the core of Wuhan's production of optical fiber and cable, optoelectronic components, optical transmission equipment, and optical instruments.

China's largest cable production, optical fiber, and electronic devices companies are located in Wuhan. The city is also reported to be the largest manufacturing base of optical fiber and cable in China[1] and the third largest in the world.[2] Companies in the region combined can produce 2,500,000 km of optical fiber in a year, and 60,000 km of optical cable.[3]

Growing an Industry

Though Wuhan has a robust history of optics development, the Chinese government began focusing on growing this area in the early 1990s. In 1991 the state designated a corner of Wuhan as the Wuhan East Lake High-Tech Development Zone (WEHDZ). Early in 1994, the Chinese government decided to establish a national research center of optical telecommunications engineering in Wuhan. Wanting to make use of the optics cluster already in place in the WEHDZ, in 2000 the Wuhan city government established the OVC within the WEHDZ's borders, modeled after Silicon Valley and Arizona's Optics Valley. The goal was to develop the OVC into an international leader in optical communication and optoelectronics.

The next year, both the Chinese Ministry of Science & Technology and the National Development and Reform Commission of China certified and approved the OVC as China's optoelectronic and information industry base, adding state fuel to the technology boom in Wuhan.

As part of China's 10th five-year plan (2001-2005), Wuhan was given the following tasks: establish the OVC as China's leading optoelectronics and information technology industrial center within a 50 km^2 area in the WEHDZ; increase annual revenues to 100 billion RMB (US$125 million); accelerate the industrialization of technical breakthroughs; encourage both Chinese and foreign companies to set up in the OVC; and establish the OVC as a leading Chinese and world-class model base for R&D, academic exchange, training, and industry for optoelectronics and information technology.

As of 2005, there were 40 Fortune 500 companies working in Wuhan,[4] and incoming foreign investment in Wuhan was US$1.5 billion[5] for that year, with 612,000 people employed in science and technology R&D in the Hubei province, according to the Chinese Ministry of Science and Technology. There are six state engineering technology research centers, four key state laboratories, 19 universities, and 38 scientific and research institutes in the region.[6]

Optics Foundation

Despite all the recent attention, the optoelectronics industry has had a presence in Wuhan for more than 30 years. It is considered by many to be the cradle of the optoelectronics & telecommunications industry in China, and the institutions that started it are still major players in the field.

Opening its doors in 1974, Wuhan Research Institute of Posts and Telecommunications (WRI) established the first optical telecommunications line in China in 1982. It is currently the biggest telecommunication R&D base in China.

"Wuhan Research Institute of Posts and Telecommunications has been the foremost R&D lab in China in lightwave communications, having spun off four successful 'private' companies, in each of the areas of photonic active devices, optical passive components, optical fiber and cable, and lightwave equipment and systems," says Tingye Li, an active member of SPIE as well as the international telecommunications community, and now retired from AT&T Labs.

Wuhan University is one of the oldest universities in central China, originally founded in 1893, and now has two key state-level laboratories, three state-level laboratories, and two state-level research centers in engineering.

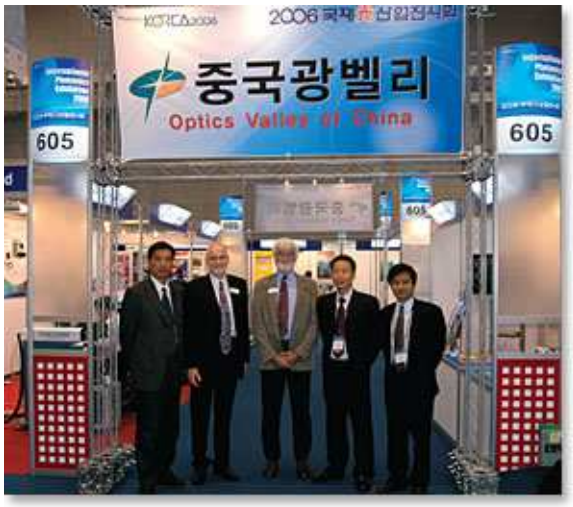
China's first key laser technology laboratory was established at the Huazhong University of Science and Technology (HUST). HUST is also home to the Wuhan National Laboratory for Optoelectronics (WNLO) (see sidebar).

Bob Kovitz, an Oro Valley, AZ, governmental and community relations administrator, wrote in his column for *The Explorer*, "The campus of Huazhong University of Science and Technology makes the University of Arizona look like an elementary school. There are more than 80,000 students here and the campus goes on and on—spread over miles of flatland and hills."

Wuhan University, HUST, and the WRI have all spawned companies that have gone into business for themselves, but are still tied to the universities for financial support and lab space.

Like other high-technology development zones in China, enterprises in the WEHDZ benefit from state-level preferential policies. Both state and city governments have invested millions of dollars into the OVC, and created incentives like tax breaks, refunds, exemption from fees, and special status in order to encourage foreign and domestic companies to set up shop in Wuhan.

Amazingly, Wuhan was not fully open to foreign trade until 1992, yet in 2005 Hubei province registered a foreign trade total of US$9.09 trillion, with Japan, Germany, and the United States the top investing nations.4 The full reversal of state policy and promotion of growth in a little over a decade, exemplified by the debut of the OVC, is indicative of China's strong determination that it will play an international leading role in optics and photonics research, development, and production.



SPIE CEO Eugene Arthurs and 2007 President Brian Culshaw (second, third from left) in the OVC Pavillion at 2006 APOC Symposium.

SPIE Connection

SPIE is supporting the OVC's researchers and scholars as well. In September 2006, SPIE cosponsored the 5th Optics Valley of China International Optoelectronic Exposition and Forum, and this year the 2007 Asia-Pacific Optical Communications (APOC) symposium will be held in Wuhan 1-5 November. Wuhan also hosted the SPIE APOC 2003 symposium.

"I would like SPIE to become very involved in helping Chinese researchers interact with the international community in optics and photonics," says 2006 SPIE President Paul McManamon. "As China becomes a force in optics and photonics I'd like SPIE to be right next to them. This is SPIE's role in the world."

China has now begun its 11th five-year plan (2006-2010). Wuhan's new goals include sprucing up the WEHDZ and accelerating the development of one of its "pillar" industries—optoelectronics.[7]

Through efforts such as the OVC development, China is quickly becoming a force in the world of optoelectronics and telecommunications.

Wuhan National Laboratory for Optoelectronics

In 2006 SPIE signed a Memorandum of Understanding with the Wuhan National Laboratory for Optoelectronics. Here are some facts about the young laboratory:

- Founded in November 2003
- Officially opened November 2005
- One of five national laboratories sponsored by the Chinese Ministry of Science and Technology
- Co-sponsored by China's Ministry of Education, Hubei Provincial Government, and Wuhan Municipal Government
- 405,000 ft.^{2}
- 60% of the building devoted to lab space
- Lab director: Chinese Academy of Sciences Academician Ye Zhaohui
- Division of Biomedical Photonics leader: SPIE Fellow Qingming Luo
- Areas of research: optoelectronic devices and photonic integration,

nanophotonics and MEMS, communication and intelligent networks, biomedical photonics, data storage system, laser science and technology

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References
1. Canadian Advanced Technology Alliance, www.cata-china.org
2. www.telecom.globalsources.com/gsol/I/Fiber-optic/a/9000000079199.htm
3. Wuhan East Lake High-Tech Development Zone, www.wehdz.gov.cn/en/home.htm
4. Network of the Kingdom of the Netherlands, Holland in China, www.HollandinChina.org
5. "Investment Climates Around the World: A Global Summary for 2006 continued," *Business Facilities Magazine* (October 2006)
6. UNIDO Investment Promotion Programme Office for Southern China, www.ipa-china.org
7. Wuhan Investment Promotion Bureau

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