The continued improvements in modern semiconductor optoelectronic and electronic devices and integrated circuits over the last several decades contribute to the emergence of the Information Age. The 90s have witnessed an unprecedented explosion in the handling of information. This trend is expected to continue with an accelerated pace as we enter the 21st century.

The processing of information can, in general, be divided into six different categories: information generation, information detection, information amplification, information transmission, information processing and information display.

In line with the rapid development of the information industry, the PolyU has established The Cooperative Research Centre for the Development of III-V Nitride Optoelectronic Components. The objective of the Centre is to conduct applied research to develop III-V nitride-based optoelectronic devices for applications in the information industry.

The continued growth in the information industry will have a significant impact on the market for optoelectronic and high-speed electronic devices and circuits. Of the different compound semiconductor devices, the III-V nitride family is projected to have the highest growth rate over the next decade. A study by Strategies Unlimited, a consulting firm in the US, has projected the growth of gallium-nitride-based devices from a mere 2% in 1997 to 20% market share of the total compound semiconductor sales with an estimated volume of US$3 billion by 2006, as shown in the figure on the right.

The development of gallium nitride blue LEDs in 1993 is a significant milestone in display technology. In particular, gallium nitride technology is highly relevant to the flat panel display industry in Hong Kong, which accounts for approximately 20% (US$1.8 billion) of the world market. LEDs are used for backlighting behind Liquid Crystal Display (LCD) panels. The most attractive features about LEDs are their fast switching time and long lifetime.

Hong Kong is in a unique geographical location. With Pearl River Delta and in fact, the Chinese mainland right at her doorsteps, Hong Kong has all the potential factors to become the forefront product research and development centre for the Region. Although a good number of Asian countries have suffered from the recent financial crisis, many still project the Region to re-establish itself as one of the highest growth areas in the world. Hong Kong is already a financial powerhouse in the Region. However, it is clear from the recent financial woes that Hong Kong also needs to revitalize its industries to become competitive again.

The Cooperative Research Centre, with funding support from the Research Grants Council, The Hong Kong Polytechnic University and ASM Assembly Automation Limited, aims to meet the challenges for the development III-V nitride-based optoelectronic devices such as blue LEDs, ultraviolet detectors and lasers. The team consists of staff members and graduate students and research assistants from PolyU’s Department of Electronic and Information Engineering. In addition to Dr. Charles Surya, who is the principal investigator of the Centre, also involved in the programme are Prof. Joshua Wong, Dr. Alex Wai and Mr. K.Y. Tong, who are experts in the area of
photonics technology and thin film growth. Besides working closely together for the development of the technology, the team has ongoing collaborative efforts with the Laboratory for Laser Energetics of the University of Rochester, New York and Fudan University of China. The University of Rochester is known for their premier work in the field of ultra fast optoelectronics.

The most crucial first step for the Centre is to master the techniques for the growth of high-quality gallium nitride films. To help accomplish this task the Centre has established a Molecular Beam Epitaxy specially designed for the deposition of III-V nitride materials. The team has invested substantial effort in improving the materials in the past months and is encouraged to finally see some positive results from the hard work. A gallium-nitride-based ultraviolet detector has been fabricated successfully. The detector is being characterized by Professor T.Y. Hsiang of the Laboratory for Laser Energetics and the Electrical and Computer Engineering Department of the University of Rochester, and has been found to exhibit a response time as short as 500 picosecond. There is still a long way from accomplishing the quality of a marketable product but the team strongly believes that this will not be too distant a day from now.
Helping An An and Jia Jia settle in at Ocean Park

Although the giant panda (Ailuropoda melanoleuca, meaning black and white bear) was unknown in the West until the latter half of the 19th century, it has been revered in China for hundreds of years and Chinese emperors often kept them as pets. The Chinese name for the giant panda is ‘Da xiongmao’, meaning ‘great bear cat’ and many people believe these animals have mystical powers capable of diverting natural disasters and evil spirits.

This amazing animal is under serious threat of extinction and it is estimated that only 700 to 1,000 are still alive in the wild, existing in a few, small, forest areas in China. They are under constant threat from poaching and human encroachment on their habitat. Individuals have now become isolated as they are unable to cross developed areas to find new food sources or potential mates.

As a special symbol of reunification, the Chinese mainland has gifted Hong Kong with two giant pandas, a male, An An, and a female, Jia Jia, who have settled comfortably and happily in their new, custom-built $80,000,000 enclosure at Ocean Park. The public can now visit and see these great bears, in their simulated natural habitat of around 2,000 sq.m., at close range. What the public will not see are the incredible facilities provided for the care and welfare of these animals behind the scenes, nor all...
the work and effort that go into their daily care. These facilities include quarantine, den and ‘quiet’ areas, plus a state-of-the-art hospital facility dedicated solely to the pandas. It was here that An An and Jia Jia were kept for the first weeks after their arrival from the Wolong Nature Reserve, under the watchful eye of Curator Timothy Ng and vets Dr. Natalie Rourke and Dr. Natalie Mauroo. Mainland scientists Dr. Hu Da-ming and Mr. Han Hong-ying have accompanied the pandas from Wolong and will remain for some time to share their knowledge and experience, and also to learn how the animals will be cared for in Hong Kong.

As new arrivals at the Park, it was necessary to keep An An and Jia Jia in quarantine and to conduct detailed medical and health checks to ensure that they were both fit and healthy. These check-ups included full body measurements, blood tests, dental examinations, X-rays and ultrasound examinations. All check-ups were carried out with the pandas under general anaesthetic as, despite their docile manner and appearance, these are wild animals! Ocean Park gathered together an impressive group of experts to assist, including Dr. Sam Silverman, a veterinary radiologist from San Francisco, and a local team of thoracic specialists from Queen Mary Hospital, led by Dr. Ken Leung. Because of long association with Ocean Park and experience in examining other large animals, I was also privileged enough to be asked to participate in this, undertaking the initial X-ray and ultrasound examinations. Very few living pandas have been examined in this way, as the reserves in China do not generally have access to the equipment required. To my knowledge, only the pandas kept in zoos in Berlin, Mexico and San Diego, have been scanned before and thus the information obtained from An An and Jia Jia is extremely valuable and has added much to our knowledge of the normal anatomy and biophysical profile of the species. This information will be published in conjunction with the findings from the pandas in Mexico and San Diego and should contribute towards the care of other pandas in the world.

Both An An and Jia Jia have been declared fit and healthy, the only finding being some arthritis in Jia Jia’s left forepaw. Jia Jia is now 21 years of age and this is not unusual in an animal of her age. She has successfully raised at least four cubs, but is not expected to breed again now. An An is 16 years old. Both pandas are wild-born but were brought in to the rescue centre at Wolong as very young animals, having been found close to starvation. An An was abandoned by his mother and Jia Jia was a victim of a periodic die-off of bamboo, the staple diet of the species, which left her struggling to survive. The life span of giant pandas in the wild is thought to be about 25 years and some have lived much longer in captivity, providing millions of people the opportunity to see and learn about these unique animals and the efforts being made to save them. Now the public in Hong Kong has the same opportunity to learn about and contribute to the future well-being of this special symbol of China.