Asian Youth Cool to Science, Too

As economies in Asian countries mature, scientists and engineers are in greater demand than ever—but science degrees aren't. "With affluence, more students are opting for humanities and the arts," says Chew Tuan Chiong, director of the Singapore Science Center.

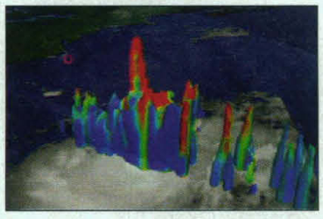
Many nations seem to share a trend noted in Japan's 1997 White Paper on Science and Technology, which reported that only 43% of young adults found science interesting—a decline of 6.5% from 5 years ago and the lowest rating of any age group. "People may perceive that there's less of a problem in Asia [than in the U.S. and Europe], but that's simply not true," says Chew. So, governments are seeking ways to stoke up youthful interest in science.

Last month the 12-nation APEC (Asia-Pacific Economic Cooperation) put on its first Youth Science Fair, in Seoul, Korea. In addition to displays, tours, and demonstrations, students from 12 nations got a taste of folksy Western-style tutelage in a keynote talk by Australian Michael Gore, director of Questacon, an interactive science museum in Canberra, who demonstrated principles of physics with a hot water bottle, a cowboy, and chickpeas. One Seoul high-schooler said Gore's lesson was a world apart from her classes where "the teacher says something and one has to memorize everything. ... We just study textbooks for a test, not for understanding."

Science on stage in Seoul.

Bonnie's Big Cloud

Hurricane Bonnie, which blew up the U.S. Atlantic Coast late last month, left some striking images in her wake, including this towering cloud that reached 18,000 meters—equivalent to two Mount Everests—above the eye of the storm. The image was caught when Bonnie was moving very slowly, allowing warm, moist air to pile up and rise to unusual heights in the upper atmosphere. The picture was taken on 22 August by a radar aboard the Tropical Rainfall Measuring Mission satellite.



NASA

Looking Into Emotions

Researchers say they have recently completed the largest study yet testing the validity of Automated Face Analysis—teaching a computer to recognize not faces but facial expressions. Such a tool could be used, for instance, in assessing whether a criminal suspect is telling the truth, in diagnosing mental illnesses, and in refining human-computer interaction.

A number of groups have been trying to computerize face analysis, using a Facial Action Coding System devised by psychologist Paul Ekman at the University of California, San Francisco, that breaks expressions into action units (AU). "Manual" coding, in which experts code a slowed videotape frame by frame, is very time-consuming, notes psychologist Jeffrey Cohn of the University of Pittsburgh.

Cohn and Takeo Kanade of the Carnegie Mellon University Robotics Institute say their study asked 100 college students to perform a series of facial expressions. Compared with manual ratings, the computer program got the right codes about 90% of the time, the authors report in a paper in press in the journal *Psychophysiology*. The system was slightly less good at differentiating an authentic smile, which combines an around-the-eye muscle AU with a cheek muscle contraction, from a phony one, which only involves the cheek. But Cohn predicts that computers will someday be more reliable than humans in quantifying both the timing and location of subtle changes in expression.

Computational neuroscientist Terrence Sejnowski of the Salk Institute says, "Detecting facial expressions is a much more difficult problem than we imagined, because [humans] are so good at it."

JEFFREY COHN

The Ears Have It

If you temporarily wear a pair of distorting eyeglasses, it usually takes as long to readjust as it did to get used to them. But researchers who spent 6 weeks wearing a pair of funny ears have found that readjustment is a snap, suggesting that the human brain can hold several auditory "maps" at once.

The outer ear doesn't help determine what side a sound is coming from but is thought to help the brain distinguish "up" from "down"—through the echoes and distortions that occur as sound waves bounce off its ridges and folds. To see how quickly the brain would adapt to a new set of signals from the outer ears, John Van Opstal, a biophysicist at the University of Nijmegen in the Netherlands, and three colleagues fashioned plastic ears with altered ridges.

To pinpoint the effect of the ears, the team rigged a robotic arm with a speaker that moved to random locations in a dark room and emitted short bursts of white noise. They found that the ears completely disrupted perceptions of whether sounds were coming from above or below, the researchers report in the September *Nature Neuroscience*. After a few weeks, the ear wearers had compensated and were able to make correct judgments.

The surprise came when they finally removed the ears: They were immediately able to adjust to their old ears. "That's quite astounding," says Fred Wightman, a psychologist at the University of Wisconsin, Madison. He says it may mean that locating objects by sound is a more complicated cognitive function than with vision.