ed. During a 10-day occupation of station offices on Isabela, hair dryers that kept tortoise eggs warm enough for embryos to develop were taken. Many of the eggs "will possibly die," including several embryos of critically endangered populations, according to recent e-mails to Snell from Ecuadorian herpetologist Cruz Marquez. The fishers also destroyed tortoise pedigree records, which ensure that the different island tortoise subspecies remain purebred. But because the breeding program hatches several hundred tortoises a year, Snell says, the damage was relatively minor.

The 220 employees and volunteers at the research station are frustrated by recent events but have resumed their work, which includes efforts to save endangered native plants, control introduced plants, track the rich marine ecosystem, and breed endangered tortoises and iguana subspecies endemic to the islands, Tye reported in a 7 December e-mail. Research station staff and park workers also held a peaceful march on 23 November in Puerto Ayora, the largest town in the islands, to protest the violence and rally support for conservation. But the rally was postponed for 6 days because of threats of violence from local fishers.

The biggest casualty of the riots could be the current conservation policy, which was widely seen as a way to include all interested parties. But enforcement against overfishing of lobsters, sea cucumbers, and long-lining for shark fins has been weak, often ignoring the limits. "Within the conservation community, there's a tremendous amount of frustration and disappointment," Snell says.

Meanwhile, an uneasy calm prevails. Park officials have petitioned Ecuador's president, Gustavo Noboa Bejarano, for protection against what they call "ecological terrorism," and the fishers, while busy fishing, have threatened to renew their strike. The Ecuadorian government jailed three of the fishers, charging them with terrorism, and Noboa has promised that any convictions will be "sanctioned with the full force of the law." Many people are skeptical, however. "We've had lots of words. What we need is action," says a Western diplomatic source in Quito, who spoke on condition of anonymity.

One environmental group, the Sea Shepherd Conservation Society, is taking action. Society president Paul Watson and his crew set sail for the Galápagos on 7 December from Los Angeles in *Sirenian*, a 29-meter former U.S. Coast Guard vessel. Carrying replacement computers and other supplies donated by U.S. scientists, the ship is scheduled to arrive this weekend. Park personnel, aided by three armed members of the Ecuadorian navy, will use it to patrol Galápagos waters for 5 years. The team plans to fight poaching by "confiscating" illegal fishing boats and their cargo. "This is a crisis situation," says Watson. "If we can't save the Galápagos, what the hell can we save?"

–DAN FERBER

BIOMATERIALS

New Chinese Biochip Center Straddles Business, Academe

China taps a U.S.–trained entrepreneur and researcher for a new enterprise intended to lead the country into the big leagues of a burgeoning field

BEIJING—Meet Cheng Jing, the new face of Chinese science. As a U.S.–trained researcher, head of an academic center–cum–commercial enterprise in Beijing, and founder of a biotech company in San Diego, the 37-year-old Cheng wears many hats. But that's exactly the mix of experience Chinese officials are looking for to help lead the country into one of the hottest areas of biotechnology.

Last month, Cheng was named head of a new, two-pronged biochip venture here that will be highly unusual even for China, which has been experimenting with academic-industrial arrangements in recent years. One part is a for-profit company backed by $48 million from a combination of national and academic partners and overseas venture capital. The second piece is a nonprofit national center with nearly $10 million in research funding from the Ministry of Science and Technology.

"Our goal [in creating the venture] is to catch up with the world's most advanced level of biochip development," says Wang Li, an official from the Ministry of Science and Technology. And he says Cheng's U.S. experience was a big plus: "One of the measures we have taken is to support those scientists who came back from overseas with new ideas and skills."

The new biochip enterprise is tied to the top-rated Tsinghua University. Its two titles—the Capital Biochip Corp. and the National Center of Biochip Engineering—reflect its dual roles as research enterprise and commercial company. Cheng's mission is to train the next generation of biochip scientists and technicians and to develop new technologies that would be patented and licensed to other companies—including Aviva Biosciences Corp., the start-up that Cheng founded in San Diego. Bankrolled by nearly $30 million from the State Development Planning Commission and four academic partners, the corporation has also received $18 million in domestic and overseas venture capital. The science ministry is expected to kick in $9.6 million from a national high-tech program to fund research at the center.

CREDIT: PHOTOGRAPH PROVIDED BY CHENG JING

Chipping away. Cheng Jing hopes that his biochip center will invigorate Chinese science.

Cheng will operate Capital Biochip along Western lines, including offering stock options to employees after 1 year on the job. He also hopes to hire 30 senior scientists and engineers from overseas by matching their current salaries. Within 3 years, he anticipates having 300 employees, half of them graduate students, ensconced in a 20,000-square-meter building that should be completed by early 2002. He expects most of his current staff of 30 to join the new national center, along with people from the other institutional partners—Huazhong University of Science and Technology, the Chinese Academy of Medical Sciences, and the Academy of Military Medical Sciences.

Cheng has plenty of experience in straddling the worlds of academe and commerce. He was trained as a railway engineer in Shanghai, got a Ph.D. in forensic science in the United Kingdom, and then moved into the biochip business at the Univer-

sity of Pennsylvania. "He was the kind of postdoc that you dream about—motivated, skilled, and someone who knows exactly what he wants," recalls Penn's Larry Kricka, a professor of pathology and laboratory medicine. "He also understood the value of exploiting intellectual property. And that's key to what he's trying to do at the new center."

Cheng left Penn for the San Diego–based Nanogen, where he helped develop a bioelectronic chip that isolates and purifies DNA and RNA from a whole blood sample. But after 3 years there he wanted to be his own boss and to operate on a larger scale. So in early 1999 he returned to China as a full professor at Tsinghua, which gave him a generous budget to set up an R&D center there. "He's had tremendous support that would make many of us in the U.S. jealous," says Peter Wilding, a professor of clinical chemistry at Penn whose work over the past decade on capillary electrophoresis helped to lay the groundwork for "PCR-on-a-chip" technology.

Within months, Cheng had persuaded Tsinghua to back Aviva, which he set up down the road from his former employer. Its research staff has focused on technology that prepares the samples for analysis—the first and most difficult step in the process. In October the company unveiled its latest technology at an international biochip symposium in Beijing—a multiforce active biochip that uses micromagnets, acoustic, and dielectrophoretic forces to help isolate the material to be analyzed. In a clear demonstration of its significance, the meeting was a subset of an international conference opened by Chinese President Jiang Zemin. University officials have insisted that he spend half his time at Aviva, Cheng says, to make sure that it remains on track in licensing new technology and developing products.

Some scientists wonder if Cheng's new venture will be nimble enough to keep up with the latest technology, however. "It's not a good idea to develop the biochip industry by injecting a large amount of money in start-up funds," says Lu Zuhong, head of a biochip laboratory at Southeast University in east China's Nanjing. The key to commercial success is not a large laboratory with lavish facilities, Lu says, but quickly converting a research finding into a marketable product.

Other scientists worry that Cheng may be spreading himself too thin. The national center has targeted half a dozen areas, ranging from refining the processes underlying any microlab on a chip to creating an implantable chip for therapeutic and monitoring purposes. But Hu Gengxi, a research professor at the Shanghai Institute of Cell Biology of the Chinese Academy of Sciences, thinks that it would be better to focus on one or two promising areas.

Cheng defends his approach, saying that one goal of the center is to "provide a more solid basis for development" of the Chinese biochip industry. Its successful dissemination of new technologies, he adds, "will benefit other, smaller Chinese companies" that might otherwise not have access to them. And Cheng says that a generous budget offers him the freedom to tackle several research questions simultaneously. Cheng also says that he'll try to minimize the potential conflicts of interest stemming from all the hats he is wearing. "Although I am chief technology officer for two companies, the ideas generated during my work and discussions in the United States will belong to the American company, while the national center will benefit from my ideas and service in Beijing."

In tackling these and other issues, Cheng says there are few domestic models that he can follow. "We are making it up as we go along," he confesses. But he wouldn't have it any other way. "We need to find the right approach that works for China," he says. "You can't simply copy Western practices."

–DING YIMIN

Ding Yimin is a reporter for *China Features* in Beijing. With reporting by Jeffrey Mervis.

PROFILE
DICK MOL

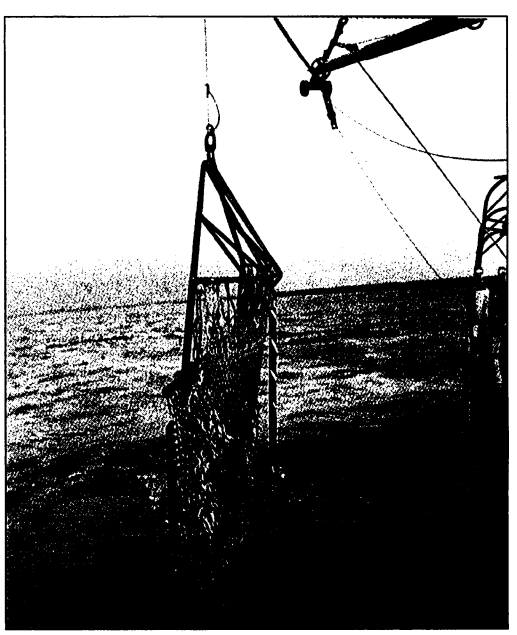
'Sir Mammoth' Leads Charge To Uncover Ice Age Fossils

Dick Mol may be an amateur, but he's had more success than most professionals in his chosen field of paleontology

ON THE EASTERN SCHELDT, THE NETHERLANDS—In the driving rain on a recent autumn day, several slicker-clad men and women stand on the deck of the Dutch mussel cutter *ZZ10*. A clanging winch hauls up a dredge net and swings it over the side. Out spills a marine cornucopia: loads of brittlefish and mussels, a few flounder, the odd worm with iridescent bristles. The crew paws through the writhing mass, pushing aside the living creatures in search of something that died ages ago.

The Tiglian-type sediments in these waters off Zeeland date from 1.6 million to 1.8 million years ago, when today's estuary was dry land inhabited by southern mammoths, squat mastodons, giant deer, and the saber-toothed cats that preyed on them. Every year for the past half-century, a gang of scientists, amateur enthusiasts, and local officials has spent a day dredging for new fossils from this exotic menagerie to honor the fishers who spend their lives on these waters hauling up relics of a long-lost era. This time, one small bone fragment defies identification—at least until one of the sharpest eyes aboard the *ZZ10* comes over to take a look. Stocky, blond Dirk Jan (Dick) Mol picks up the black bone, so heavily mineralized that it emits a sharp ping when tapped, and within a few seconds concludes that it's a fragment of a foot bone from a southern mammoth—not bad for a customs officer at Amsterdam airport. But not surprising: As paleontologist Jelle Reumer, director of the Natural History Museum in Rotterdam, explains, Mol is "Mr. Mammoth."

No other country, perhaps, embraces amateur paleontology as warmly as the Netherlands does. "Vertebrate paleontology as an academic subject now hardly exists here," says Reumer, who notes that hot fields such as genetics tend to get the few new academic positions created at universities in his country. "Amateurs help fill that gap." Mol may be the most accomplished of the amateurs, says John De Vos, a curator at the National Museum of Natural History in Leiden: "He knows every mammoth specimen in Europe. He's crazy! He's obsessed!"



Catching on. Dick Mol enlists Dutch fishing vessels in his hunt for fossils.

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