chromosomes should function in plants alongside the other chromosomes.

Postdoc Kevin C. Keith in Preuss's lab is now testing pieces of DNA from the *Arabidopsis* centromeric regions to see which ones work in cell division—the hallmark of a functional centromere. Keith is combing through all the bases in the centromeric region, including the 180-base repeats. The process is akin to going through jars of bolts in a hardware store to find the right one, in this case, a stretch of DNA that holds the minichromosome to the cell's protein motors. To do so, Keith is methodically inserting sequences of fewer than 100 kilobases into the minichromosomes to test which ones work as the centromere.

Such minichromosomes are in the works for other organisms, including humans. Apart from their use as a tool to explore chromosomal functioning, they have an applied side in genetic engineering as well. Researchers believe they will provide a controlled means of "stacking" large numbers of genes—say, for pathogen resistance—into an organism that could also be engineered to be eliminated when necessary.

One of Preuss's next interests is to use the minichromosomes to study why chromosomes don't always segregate properly and end up with two or no chromatids in a gamete instead of just one. If the gamete is used in fertilization, the resulting offspring will have an abnormal number of chromosomes, a condition known as aneuploidy. It happens between 1% and 2% of the time in *Arabidopsis*—about the same frequency as in yeast—but far more often in human meioses. The development of minichromosomes over the next 5 years "will open up tremendous resources" for exploring such phenomena, she says.

Preuss isn't the only one who thinks so. This past summer she became a Howard Hughes Medical Institute investigator, only the third plant biologist to be so recognized. To commemorate the occasion, Preuss's lab presented her with a framed collage of the pollen tetrads and the data they've generated. At the center is a photo of Howard Hughes holding a fistful of *Arabidopsis*. It's in bloom. **–CHRISTINE MLOT**

Christine Mlot is a science writer in Madison, Wisconsin.

CONSERVATION BIOLOGY

Galápagos Station Survives Latest Attack by Fishers

Researchers at the Darwin Research Station put the pieces back together after a festering dispute over fishing quotas turns violent

Botanist Alan Tye had a tough first week on the job after becoming acting director of the Charles Darwin Research Station in the Galápagos Islands in November. On Tuesday, he watched police put up barbed wire barricades after the research station on Santa Cruz was threatened with attack from local fishers. On Wednesday the fishers, angry over a quota on spiny lobsters that they feel is too low, hijacked Tye's dinghy during his commute to work. On Friday, Tye learned that Ecuadorian navy special forces had rescued two lab employees who, fearing for their lives, had taken refuge in mangrove swamps on Isabela, one of the station's three island sites.

For Tye and others who have spent years tending to the famed tortoise population and performing other conservation studies, the week of 13 to 17 November was the latest reminder of their precarious existence on this research outpost in the eastern Pacific. In 1995, fishers armed with clubs and machetes took researchers and their families hostage after authorities stopped sea cucumber fishing for the year (*Science*, 3 February 1995, p. 611). In 1997, a park ranger was shot after wandering into an illegal fishing camp. And earlier this year, fishers angry about sea cucumber quotas took several endangered tortoises hostage. Yet the station has survived for 36 years. "We've been through this before," says Tye, who hopes for peace on the 8000-square-kilometer archipelago, which lies 1000 kilometers west of the Ecuadorian mainland. "It's difficult at the time, but the experience throws us together and makes us more determined."

The fuse that set off the most recent conflagration was an annual 50-ton limit on spiny lobsters that local fishers reached barely halfway into the 4-month season. The quota had been set under a 1998 law that requires park authorities to consult with fishers, tourist service operators, and local officials and to draw on scientific advice from the Darwin station (*Science*, 20 March 1998, p. 1857). The law gives the National Park Service the authority to enforce the quotas, which are monitored by the research station, but when park officials moved in, the fishers reacted with what they term a "strike." Unruly bands laid siege to the station and the park service, blocked roads and offices, tore down the island's telephone antenna, and destroyed research records.

The park service bore the brunt of the fishers' anger. On the remote island of Isabela, where the two lab employees and park superintendent Juan Chavez were rescued from the swamps, rampaging fishers carried off computers and scrawled death threats on the walls. "They completely destroyed our office and burned absolutely everything," says park spokesperson Desiree Cruz in an e-mail. They also threatened Chavez's life and trashed his home. In other areas, fishers blocked tourist boats from landing, and a local school official who sided with the fishers threatened high school students who had written letters supporting conservation efforts. "Some of this protest activity approaches terrorism," says Darwin Station ecologist Howard Snell, who also teaches at the University of New Mexico, Albuquerque.

Some research at the station was affect-

Standing firm. Research station staff and local residents rally support against attacks (*left*) and for conservation.

CREDITS: PAOLA DIAZ/DARWIN RESEARCH STATION

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

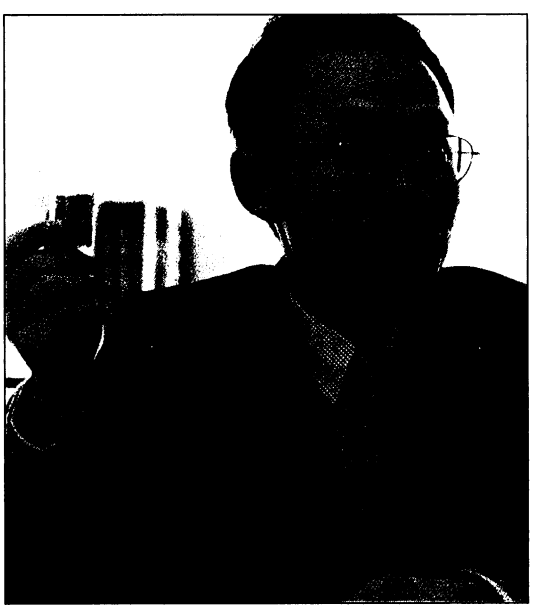
China taps a U.S.–trained entrepreneur and researcher for a new enterprise intended to lead the country into the big leagues of a burgeoning field

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-