

## EDUCATION

## Physics labs must adapt

US undergraduate students who participate in laboratory sections of physics courses show no discernible improvement in their exam scores over students who participate in only the lecture sections. In a study published in *Physics Today*, authors analysed 9 introductory physics-lab sections taught by 7 different instructors and involving nearly 3,000 students at 3 US institutions (N. G. Holmes and C. E. Wieman *Phys. Today* **71**, 38–45; 2018). The researchers compared the midterm and final exam scores of those who took the optional lab component — designed to support student learning of lecture content — with the scores of those who did not. In follow-up interviews, students said that it was important for them to make their own decisions in lab and to reflect on them, but that they were not permitted to do so in structured lab courses. The authors suggest that lab instructors could better emphasize experimentation, decision-making and critical-thinking skills. They say that students could collaborate to design experiments to test their own hypotheses for explaining surprising phenomena.

## SALARIES

## Ecology pay surveyed

Most people with US doctorates in ecology work in jobs related to the discipline, and the highest mean salary across all employment sectors — academia, industry, government and non-profit — is US\$84,900, according to the first fine-scale national profile of ecology careers, published on 21 December in *Ecosphere*. Using 2013 data from the US National Science Foundation, the authors found that 9,984 people earned a US PhD in ecology between 1968 and 2011 (S. E. Hampton and S. G. Labou *Ecosphere* **8**, e02031; 2017). Of the 91% with jobs related to the field, 66.1% work at US academic institutions and about 15% in municipal, state or federal government positions. Almost 12% work for businesses or are self-employed, and 7.5% work for non-profit organizations. Government ecologists earn a mean of \$84,900 and spend about 82% of their time in research and development (R&D) — the highest level for R&D across all ecology-related jobs. Those in academia earn a mean of \$62,530; those who are self-employed or at businesses earn a mean of \$82,873; and those in the non-profit sector earn a mean of \$74,722.



Chelsea Gardner with Rex, a stray dog that she befriended on a field site in Athens.

CHELSEA GARDNER

to 'beautiful girl'. Billo returned the favour, staying close to Thorat during the weeks and months when no other researchers lived at the field station.

When Thorat finished her fieldwork, she could not take Billo with her to her shared city apartment. So she asked the field-station staff and research crew to take care of her pet. Billo became the darling of the field station, where she is fed and cosseted.

Moving a new pet to a distant country is trickier than passing it on to colleagues. A scientist shipping an animal from India, for example, should set aside US\$2,000 at a minimum, Lee advises, though the costs will depend on the destination and airline. Securing permits in India is complicated; the alternative is an Indian pet-shipping company that can handle the red tape.

After deciding to adopt Fred, Hitchcock turned to Terminal4Pets, an Israeli pet-travel agency, to help arrange his journey. The paperwork was minimal, but the costs were not: they came to about Aus\$7,000 (US\$5,500), most of it for Fred's flights, his six-month quarantine in an Israeli kennel and a 10-day quarantine in an Australian kennel.

In some places, taking home a furry companion is easier than it was once. A single 'pet passport' is accepted by every country in the European Union and applies to dogs, cats and ferrets travelling between member states. The United Kingdom no longer imposes a six-month quarantine on incoming cats and

dogs that have EU passports. Dogs imported to the United States are exempt from the federal requirement for a rabies vaccination if departing a country without rabies.

Adopted animals from war-torn countries can experience something akin to post-traumatic stress disorder, Ayan says. "It takes a while for the stress to wear off," she says, and in a few cases, animals cannot adapt to their new homes. Fred takes anti-anxiety medication, although Hitchcock hopes to end the regimen within a year.

Sometimes intervention leads to a happy outcome. Fred, for example, initially feared car rides, vet visits and lifts, and Hitchcock worried that he'd chew up the house and clash with her little terrier. Now, he is outgrowing his anxieties, he doesn't chew or bark and he doesn't attack Hitchcock's other dog.

Another story that ended well began on Gardner's excavation site in Greece, when she and a friend started caring for two starving, tick-covered puppies. The closest shelter was far away and overrun with dogs, so the researchers fed the puppies, gave them flea and tick medicine and acclimatized them to humans in the hope that someone would adopt them. Wary of getting attached, the scientists called them only Brown Dog and Black Dog.

When Gardner returned to the site in 2017, she saw Brown Dog again — in a yard, wearing a collar. "That's exactly what we had hoped for," she says. "Something came of putting in all that time and effort. It was really a nice, happy ending for at least one of those dogs." ■

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