

What a Zoo

With an eye toward preserving endangered species, Cornell and the Smithsonian train grad students in conservation science With an eye toward preserving endangered species, Cornell and the Smithsonian train grad students in conservation science At the National Zoo in Washington, D.C.—around the corner from the giant pandas, next door to the zebras, across the park [...]

By Beth Saulnier

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At the National Zoo in Washington, D.C.—around the corner from the giant pandas, next door to the zebras, across the park from the orangutans—are some canines that resemble a fox on stilts: pointy snout, auburn fur, long legs with black socks. On one warm October afternoon, they're nowhere to be seen—until a docent calls toward their enclosure, and a pair of giant ears pokes out from the den before retreating into the cool darkness. "Well," says Cornell grad student Jennifer Nagashima '09, "this is their time to sleep."

Nagashima and the docent—a friendly woman toting a skull and pelt for demonstration purposes—strike up a chat about maned wolf conservation. Both are big fans of the animals, native to Brazilian grasslands and designated "near threatened" due to habitat loss and a bad rap as chicken thieves. In fact, Nagashima notes, the wolves play a vital role in rodent control, and half their diet is plant-based. "Most of the canids here are on dog chow meal, because it's got everything they need," Nagashima observes, as a few tourists listen in. "But a researcher started supplementing it with more fruits and vegetables and noted that their reproductive success was higher, so now there's a study where half have a normal diet and half have been supplemented. They're still collecting data, but a lot of people think it's going to be a good year for maned wolves."



Unlocking the secrets of canine reproduction is the doctoral focus for Nagashima, the first student in a joint graduate program in wildlife conservation at Cornell and the Smithsonian Conservation Biology Institute (SCBI). Students split their time fifty-fifty between Ithaca and SCBI—either the zoo or a research and breeding facility in Front Royal, Virginia—with the aim of schooling future leaders in wildlife conservation science. "The Smithsonian has access to these animals and the need to conserve endangered species, and a lot of students are interested in working on these problems—and training them

is much easier if you have an academic partner," says Alex Travis, a professor of reproductive biology at Cornell's Baker Institute for Animal Health. "With this program, students get basic scientific training in Ithaca, address core

problems, and apply those studies to endangered species management. But the idea is not that they get trained here and then go there; it's a real joint program where they're going back and forth, doing combined projects all along the way."

While the Smithsonian attracts myriad students through internships and affiliations, it's not a degree-granting institution; the Cornell collaboration gives it a more formal academic role. The University also has facilities—such as complex imaging systems and sophisticated molecular biology labs—that SCBI does not. "It's a symbiotic relationship," says Pierre Comizzoli, a reproductive physiologist at SCBI's Center for Species Survival. "We bring our expertise in the physiology of reproduction in the unconventional species, and labs like Cornell's can investigate on the cellular and molecular levels. It's exactly what we need."

With funding tight, the program has matriculated just two students so far; Travis laments that it can't afford to accept a third for the coming academic year. Nagashima was followed by Lara Mouttham, a University of Guelph grad studying how eggs develop in the ovaries of various species. "I can take my lunch break next to the tigers," Mouttham marvels. "At Front Royal, the dorms are next to the buffalos, and you literally go to sleep listening to the maned wolves howling. You're surrounded by people who are into conservation and science, who believe in what zoos can do for wildlife." Mouttham notes that the program doubles the chances for grad students to network with future collaborators or mentors—not only academic scientists but those working for conservation organizations. "Also, it's two different mindsets," she says. "Cornell does a lot more basic science, trying to understand how things work. The Smithsonian is much more applied. 'Does this work for what we're trying to do? If we freeze the egg or the sperm this way, will it live?' You're looking at the same problem from different angles, and it broadens your horizons."

Nagashima majored in animal science in CALS, inspired to become a vet after falling in love with the tigers she saw on Animal Planet. She eventually opted for conservation science instead, scoring two post-grad internships at the Smithsonian. "The first one was with African lions—but it was less exciting than I just made it sound," she says with a laugh. "Actually, I was crushing their poo. The keepers collect it but the interns sort it, freeze-dry it, crush it, and do a procedure to get the hormones out."

Nagashima is now exploring the mysteries of canine reproduction—which, as it turns out, is devilishly complex. While human in vitro fertilization has been common for decades, the procedure hasn't worked in dogs due to challenges of physiology. One factor is that when a canine ovulates, its egg is not yet fully mature; similarly, canine sperm doesn't become viable until it's exposed to the female reproductive tract. Even freezing embryos is difficult; last year Cornell was the site of the first birth in North America—and only the second in the world—resulting from a cryopreserved embryo. (The puppy, a beagle-Lab mix dubbed Klondike, was adopted by a Baker staffer.) That work, like other studies, is done in domestic animals, often using ovaries gleaned from spay-neuter clinics. "You don't want to be learning things for the first time in the endangered African wild dog or Ethiopian wolf," Travis says. "If you need to do an embryo transfer and spay an animal at the end of it, you don't want it to be one that's endangered."



Travis notes that for zoos around the world, assisted reproduction is essential to maintaining viable populations and preventing inbreeding. "As more species are becoming critically endangered, and you get fragmented populations—a couple in a zoo in Europe, a couple here—moving genes around becomes increasingly important," he says. "So the need for these techniques is going to grow dramatically." Since it's often not desirable or practical to move the animals from zoo to zoo for mating—in addition to causing stress, it can disturb pack order, and mate aggression is a concern—the current practice is to ship semen samples. At Front Royal, Nagashima has helped with sample collection in the maned wolf as well as in a threatened horse species. "That's done by electro-ejaculation," she says, "which is hard to explain to my parents."

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