► 4-metre Victor M. Blanco telescope, part of the Cerro Tololo Inter-American Observatory in Chile. Data collection began in 2013; the current map is based on the first year of measurements, which logged 26 million galaxies in the southern sky and their apparent shapes.

According to Albert Einstein's general theory of relativity, mass warps space, so a large amount of matter in the foreground of a galaxy can bend its light in a way that makes the galaxy look slightly squashed. This is true whether the foreground mass is made of ordinary matter or of invisible dark matter. Galaxies can appear squashed for other reasons, including their actual shapes and orientations. But if many galaxies in a certain region of the sky seem on average to be skewed along the same direction, gravitational lensing is the probable culprit.

The DES cosmologists were able to tease out the composition of the Universe in a similar way to how the CMB surveys have done in the past — most recently using the European Space Agency's Planck satellite. Their results confirm that ordinary matter constitutes only 4% the Universe's contents. But they show a slightly smaller amount of dark matter — about 26% — than the 29% estimated by Planck, with the rest being taken up by 'dark energy', the stuff thought to be pushing the cosmos apart at an accelerating speed.

More intriguingly, the DES seems to have

found a deviation from Planck's prediction of the current lumpiness of matter. Whereas ordinary and dark matter were evenly distributed in the Universe's infancy 14 billion years ago, that is not the case in present galaxies. Gravity has been pulling the matters together into a web-like structure of clusters and filaments, with enormous voids in-between. The concentration measured by the DES is 7% lower than that predicted by the standard model of cosmology.

INTRIGUING GAP

The gap is not statistically large, at about one standard deviation. But another weak lensing project, the Kilo Degree Survey (KiDS), found the same kind of deviation last year (H. Hildebrandt *et al.* *Mon. Not. R. Astron. Soc.* <http://doi.org/cbmX>; 2016).

If confirmed, the discrepancy could mean that, over cosmic history, mass has been clumping more slowly than expected. And that could potentially reveal new physics, such as unexpected interactions between dark matter and dark energy or new types of neutrino. The DES presented its results on 3 August at a meeting of the American Physical Society at Fermilab, and

“My own view of all of these measurements is that they are stunning tests of the cosmological model.”

the authors posted a battery of ten papers online (see go.nature.com/2ubhr8l).

Although cosmological observations have been converging towards a consistent, detailed picture in recent decades, the weak-lensing observations are not the only ones still troubling researchers. Astronomers have, for instance, found that the cosmos is expanding faster than predicted on the basis of Planck data. George Efstathiou, director of the Kavli Institute for Cosmology in Cambridge, UK, and a member of both the Planck and DES collaborations, says that the clumping discrepancy is potentially more worrisome than the one relating to cosmic expansion.

Overall, researchers are excited to have another tool with which to probe the cosmos in ever-greater detail. “My own view of all of these measurements is that they are stunning tests of the cosmological model, and the precision and accuracy only keep getting better and better,” says astronomer Wendy Freedman of the University of Chicago in Illinois.

The final survey, due to conclude in 2018, will cover one-eighth of the sky; the results might be available some time in 2020, Frieman says. Ultimately, the DES aims to map a large-enough region to see how the influence of dark energy has evolved over the Universe's recent history.

“This is exciting,” Tyson says. “The future looks bright for weak gravitational lensing.” ■

CONSERVATION

Africa's scientists step up to save primates

Network aims to train a generation of home-grown leaders in research on apes, monkeys and lemurs.

BY DECLAN BUTLER

Inza Koné, a primate conservationist at the Swiss Centre for Scientific Research in Abidjan, Côte d'Ivoire, is used to overcoming adversity. During the country's bloody civil war in the 2000s, he and his colleagues managed to keep research going in conflict zones, even after most international scientists had fled, because of long-standing ties with communities in these areas. In the country's Tai National Park — one of the last vestiges of primary rainforest in West Africa — such relationships allowed long-running studies of chimpanzees and monkeys to continue safely, and largely spared the park from poaching.

As the first president of the African Primatological Society (APS), launched at a congress

near Abidjan on 24–26 July, Koné will lead another hard task: training a generation of home-grown primate researchers. The aim is for them to start and lead efforts such as the Tai Chimpanzee Project — established in 1979 by researchers from Germany's Max Planck Institute for Evolutionary Anthropology in Leipzig — and to gain the institutional buy-in needed to protect Africa's 200 or so species of apes, monkeys and lemurs.

Few primate-research and conservation efforts are currently led by Africans, and those run by scientists from elsewhere don't usually last long enough to make a difference, notes Inaoyom Imong, director of the Cross River Gorilla Landscape Project in Nigeria. “Greater involvement in and leadership of primate-conservation projects by Africans has the

potential to ensure the necessary long-term commitment to sites, stronger local ownership and sustainability of such projects.”

Continental Africa has an estimated 111 species of primate, with the greatest diversity in the Democratic Republic of the Congo, Tanzania, Cameroon, Nigeria and Equatorial Guinea. Another 103 species are found in Madagascar, an island nation and biodiversity hotspot.

But many African primate species are at risk of extinction: 37% of species on the mainland and 87% of species in Madagascar are listed as threatened. This is largely a result of habitat loss caused by human activities, such as large-scale farming and logging, as well as overhunting of bushmeat.

The APS's scientific congress will be an annual event. The first meeting brought together around 100 African primatologists and conservation biologists from across the continent, and some 30 non-Africans. “For African primatology to get its own society is tremendously important,” says Roman Wittig, a primatologist at the Max Planck Institute for Evolutionary Anthropology. “It's a milestone.”

Most primate research and conservation in Africa over the past half-century has been done by overseas researchers, says Russell Mittermeier, vice-president of the non-profit environmental organization Conservation International in Arlington, Virginia, who attended the launch. “But the job is too big to

The Western red colobus monkey (*Piliocolobus badius*) is found in Côte D'Ivoire's Taï National Park.

continue in this way," he adds. "We need a large community of African primatologists working in their own countries and helping to train new generations of specialists."

That's already starting to happen, says Wittig, who is co-director of the Taï Chimpanzee Project. "There is now a crop of well-trained African researchers who are taking the lead," he says. Koné, who is involved in the Taï chimp study and a project with Western scientists focused on the national park's monkeys, says that having local researchers as partners benefits international conservation efforts. "Local communities and decision-makers will be more sensitive to messages from nationals working in synergy with expats."

Although the prospects look bleak for primates in many parts of Africa, no species are yet believed to have gone extinct, says Wittig. But it will not be possible to rapidly solve major challenges such as habitat loss, so long-term planning is needed. Sustaining research and conservation in national parks is one of the best ways to protect vulnerable primate populations, he adds.

The biggest challenges facing African primatology are the lack of training and expertise for the continent's researchers, says Rachel Ikemeh, principal investigator of the SW/Niger Delta Forest Project in Abuja, Nigeria, and a driving force behind the APS's establishment. The society will therefore focus on training African

scientists to start conservation efforts and to lead research projects.

"Increasing the roles and responsibilities of Africans is paramount, if we consider that Africans are essentially the main custodians of primates occurring within their natural habitat across the continent," says Ikemeh, who saw plenty of future leaders in primate conservation and research at the congress.

"We can bring many more people to work on primate conservation in their own backyards."

For funding agencies, it can be more cost-effective to support nationals in countries with primate populations than to employ international researchers, says Mittermeier. "We can bring many more people to work on primate conservation in their own backyards."

Mittermeier points to Brazil, a world leader in primatology, as an example of what can be achieved. Since its creation in 1979, the Brazilian Society of Primatology has spurred research and conservation efforts, supported hundreds of Brazilian primatology PhD students and helped to build extensive networks among non-governmental organizations, universities and government, he says. "Now is the time for Africa." ■

EPIDEMIOLOGY

Early births tied to poor sleep

Three million mums studied.

BY AMY MAXMEN

Despite strides in maternal medicine, premature birth remains a vexing problem worldwide. But an analysis of medical records from almost 3 million pregnant women in California suggests that a surprisingly simple intervention — better sleep — might help to address the issue.

Scientists found that women who had been diagnosed with insomnia or sleep apnea were about twice as likely as women without these disorders to deliver their babies more than six weeks early. "It seems obvious, but strangely this study has not been done before," says Laura Jelliffe-Pawlowski, an epidemiologist at the University of California, San Francisco (UCSF), and an author of the study published on 8 August (J. N. Felder *et al. Obstet. Gynecol.* **130**, 573–581; 2017).

Public-health experts say that improved treatments for pregnant women with serious sleep disorders could save babies' lives. Every year, 15 million babies worldwide are born prematurely — more than 3 weeks before the end of a typical full-term pregnancy of 40 weeks. These children have less time to develop in the womb, and 1.1 million will die from birth-related complications. Many others are left with disabilities and various health issues.

The analysis is part of the US\$100-million UCSF Preterm Birth Initiative. It aims to mine large quantities of historical data, and to use the findings to identify and test medical and social interventions that could reduce the number of premature births.

The latest study examined the records of almost 3 million births that took place in California between 2007 and 2012. These were scrubbed of any identifying information.

Insomnia increased a woman's risk of giving birth prematurely by 30%, whereas sleep apnea increased the risk by 40%. And 5.3% of women with sleep issues delivered their babies very prematurely, when less than 34 weeks pregnant, compared to 2.9% for women without such a diagnosis.

Researchers say that a lack of sleep is unlikely to be a direct cause of early births, but it could trigger other processes, such as inflammation, that eventually result in prematurity.

"I counsel women on how to have the best pregnancy outcome," says Louis Muglia, director of the Center for Prevention of Preterm Birth at Cincinnati Children's Hospital Medical Center in Ohio. "Now I might start asking, 'Do you get a good night's sleep?'" ■