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# The Law of Urination: mammals take 21 seconds to pee

Research sheds new light on the science of relief

By **Amar Toor** (<http://www.theverge.com/users/Amar%20Toor>) on October 19, 2013 10:09 am Email (<mailto:amar.toor@theverge.com>) @amartoo  
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Researchers at the Georgia Institute of Technology have discovered a new golden rule: every mammal takes about 21 seconds to urinate. Patricia Yang and her co-authors dubbed it the "Law of Orientation" in a [paper published this week](http://arxiv.org/abs/1310.3737) (<http://arxiv.org/abs/1310.3737>), and they say it applies across a wide range of animal sizes.

Yang and her team discovered this commonality after observing male and female cows, dogs, elephants, goats, and rats at the Atlanta Zoo. They filmed these animals urinating, taking note of their size, bladder pressure, and urethra length, and then searched for videos of other peeing animals on YouTube. Based on mathematical models derived from these data, the scientists found that every animal took an average of 21 seconds to relieve itself, despite bladders that varied in volume from 100 milliliters to 100 liters. The video below offers a more visual explanation.

That's not to say that animal size doesn't matter. According to Yang, it just doesn't have a significant impact. Prior to this study, most urination models focused on bladder pressure and relatively small mammals. As a result, they didn't take gravity into account.



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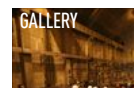


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As *New Scientist* explains (<http://www.newscientist.com/article/dn24425-universal-law-of-urination-found-in-mammals.html#.UmKJcpRgahh>), an elephant's long urethra — one meter, with a diameter of ten centimeters — gives its urine more time to pick up speed. Because of this, the animal can empty its enormous bladder in about the same time as goats, dogs, and other medium-sized mammals. For small mammals like rats and bats, gravity doesn't exert much influence on flow rates, which are instead determined by viscosity and surface tension. That's why they urinate in small drops, Yang says, finishing the job in less than a second.

The researchers will present their findings next month at the American Physical Society Division of Fluid Dynamics meeting.

VIA

SOURCE [ARXIV.ORG \(HTTP://ARXIV.ORG/ABS/1310.3737\)](http://arxiv.org/abs/1310.3737)

NEW SCIENTIST ([HTTP://WWW.NEWSCIENTIST.COM/ARTICLE/DN24425-UNIVERSAL-LAW-OF-URINATION-FOUND-IN-MAMMALS.HTML#.UMKJCPRGAAH](http://www.newscientist.com/article/dn24425-universal-law-of-urination-found-in-mammals.html#.UmKJcpRgahh))

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Some people have too much time on their hands.

Oct 19, 2013 | 10:15 AM (#191681675)

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Then why are women taking so long?

Oct 19, 2013 | 10:17 AM (#191681849)

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They're not peeing. They stand in the stall together and talk and mess with each other's faces and hair. Not all women do this, and I know because I asked my daughter. She thinks it's stupid, because she's 8 and really has to go sometimes.

Oct 19, 2013 | 11:09 AM (#191687303)

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And why do we want to know this?

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I usually take a good 45 seconds, but I am pretty liberal with the extra shakes.

Oct 19, 2013 | 10:17 AM (#191681881)