



October 18, 2013 12:30 pm

**There's a Universal Law of Urination in Mammals**
[Like](#) 43 | [Tweet](#) 50 | [+1](#) | [REDDIT](#) | [DIGG](#) | [STUMBLE](#) | [EMAIL](#) | [+](#) MORE
Image: [Per Jensen](#)

Scientists are always looking for fundamental laws—patterns that can explain the way the world works in a nice, consistent manner. They find these laws in the conservation of energy, the laws of quantum mechanics, the flow of fluids and, now, the flow of urine. According to *New Scientist*, mathematicians have worked out the law of urination for mammals. [Jacob Aron writes](#):

While filming at a local zoo, they noticed that animals of various sizes, both male and female, took a similar time to empty their bladders.

The team filmed rats, dogs, goats, cows and elephants urinating and gathered footage from YouTube of others relieving themselves. Combining this with data on mass, bladder pressure and urethra size, they were able to create a mathematical model of urinary systems to show why mammals take the same time to empty their bladder, despite the difference in bladder size.

It turns out that they all take an average of about 21 seconds to empty their bladders, nearly regardless of how big they are. There are some exceptions. Very small mammals like rats and bats urinate very quickly, in under a second, while elephants are big enough that gravity accelerates their urine so fast that they beat out most mid-sized mammals in the pee race.

According to the researchers, [who published their preliminary results on ArXiv](#), there's a good reason to study urination time. "This study may help in the diagnosis of urinary problems in animals and in inspiring the design of scalable hydrodynamic systems based on those in nature," they write.

More from Smithsonian.com:

[From Gunpowder to Teeth Whitener: The Science Behind Historic Uses of Urine](#)  
[Why Asparagus Makes Your Urine Smell](#)

\*\*\*

**Sign up for our free email newsletter and receive the best stories from Smithsonian.com each week.**

Posted By: Rose Eveleth — New Research, Physics, Wildlife | Link | Comments (0)

## We Recommend



### How to Build a Windfarm (1:51)

Every windmill in this huge windfarm will need to be put together piece by piece in a delicate procedure that takes the power of a machine and the precision of human hand



How to Build a Windfarm (1:51)



How Do You 3-D Scan a Dinosaur? (2:36)



Discovering New Species in the Amazon (5:04)



Hiding in a Coconut (01:14)

## Around the Web

by nRelate

No Comments »  
No comments yet.

[RSS feed for comments on this post.](#) [TrackBack URI](#)

Leave a comment

Name (required)

Mail (will not be published) (required)

Website

Comments are moderated, and will not appear until Smithsonian.com has approved them. Smithsonian reserves the right not to post any comments that are unlawful, threatening, offensive, defamatory, invasive of a person's privacy, inappropriate, confidential or proprietary, political messages, product endorsements,