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When You Gotta Go, You Gotta Go . . . for about 21 Seconds

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People are mostly water. So are all mammals. Sometimes, we mammals are made of a little more water than we care for, which is when it becomes time to get rid of some - if you know what I mean.



Treadmill mouse has to go, for about 21 seconds, in this [video by New Scientist magazine](#)

I wouldn't have thought there was much a physicist would have to say about urinating, but that's where I would be wrong. At the upcoming APS Division of Fluid Dynamics meeting, a [session on biofluids](#) includes two papers dedicated to the physics of fluid elimination in mammals.

[One talk](#), that was recently highlighted online in [New Scientist magazine](#), presents data showing that all mammals urinate for an average of 21 seconds. The Universal Law of Urination, as the researchers call it, holds for creatures ranging in size from mice to elephants, which pretty much covers the bulk of the mammal scale. New Scientist even included a video consisting of animals in action, so you can check the law yourself. It's pretty amusing to see a mouse on a treadmill when time comes to go, but beware - the elephant portion of the video includes some bonus action that some people might find a bit distasteful.

Another talk in the session, titled [Urinal Dynamics](#), begins with this angst-filled statement, "In response to harsh and repeated criticisms from our mothers and several failed relationships with women, we present the splash dynamics of a simulated human male urine stream impacting rigid and free surfaces." I hope these intrepid scientists have some insight that will help reduce water closet related strife.

Other talks in the session seek to explain how [insects move fluids](#) by contracting sections of tubular structures in their bodies, illustrate the dynamics of pumping in the [early-stages of heart development in embryos](#), and offer experiments that [clarify the role of amniotic fluid](#) in pushing out babies during birth.

In the event that you're shocked to see physicists dabbling in biological fluids like this, you should know about the [other Einstein equation](#), written down by Albert's son Hans. The equation provides the viscosity of fluids based on the concentration of, ahem, solids they contain. The equation came about as a result of Hans' work in designing sewage systems for large ships.

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