

iOS app (<http://itunes.apple.com/us/app/the-huffington-post/id306621789?mt=8>)

Android app (<https://play.google.com/store/apps/details?id=com.huffingtonpost&hl=en>) [More \(/big-news/#\)](#)

(<http://www.huffingtonpost.com/science>)

Edition: U.S. ▾

Follow

Newsletters

Huffington Post Search

FRONT PAGE

POLITICS

BUSINESS

ENTERTAINMENT

([HTTP://WWW.HUFFINGTONPOST.COM](http://www.huffingtonpost.com)) ([HTTP://WWW.HUFFINGTONPOST.COM/POLITICS/](http://www.huffingtonpost.com/politics/)) ([HTTP://WWW.HUFFINGTONPOST.COM/BUSINESS/](http://www.huffingtonpost.com/business/)) ([HTTP://WWW.HUFFINGTONPOST.COM/ENTERTAINMENT/](http://www.huffingtonpost.com/entertainment/))

Science (<http://www.huffingtonpost.com/science/>) • Asteroids (<http://www.huffingtonpost.com/news/asteroids/>) • Brain (<http://www.huffingtonpost.com/news/brain/>)

- Dinosaurs (<http://www.huffingtonpost.com/news/dinosaurs/>) • Girls In STEM (<http://www.huffingtonpost.com/news/girls-in-stem/>)
- Human Origins (<http://huffingtonpost.com/news/human-origins/>) • ISS (<http://huffingtonpost.com/news/iss/>) • Mars Rover (<http://www.huffingtonpost.com/news/mars-rover/>)
- Physics (<http://huffingtonpost.com/news/physics/>) • Search For E.T. (<http://huffingtonpost.com/news/search-for-et/>) • Spaceflight (<http://www.huffingtonpost.com/news/spaceflight/>)
- Talk Nerdy To Me (<http://www.huffingtonpost.com/news/talk-nerdy-to-me/>) • Weird Science (<http://www.huffingtonpost.com/news/weird-science/>)

(http://www.huffingtonpost.com/2014/07/03/bone-house-wasp-ant-corpse_n_5552309.html)
 Nightmarish Wasp Has More Than A Few Skeletons In Its Closet
 (http://www.huffingtonpost.com/2014/07/03/bone-house-wasp-ant-corpse_n_5552309.html)

(http://www.huffingtonpost.com/2014/07/03/brazil-snake-island-viper-venom_n_5552149.html)
 Here's The Scaly Reason You'll Want To Stay Far Away From This Island
 (http://www.huffingtonpost.com/2014/07/03/brazil-snake-island-viper-venom_n_5552149.html)

(http://www.huffingtonpost.com/2014/07/01/x-rated-math-words-dirty_n_5547923.html)
 Six 'X-Rated' Math Terms That Only Sound Dirty
 (http://www.huffingtonpost.com/2014/07/01/x-rated-math-words-dirty_n_5547923.html)

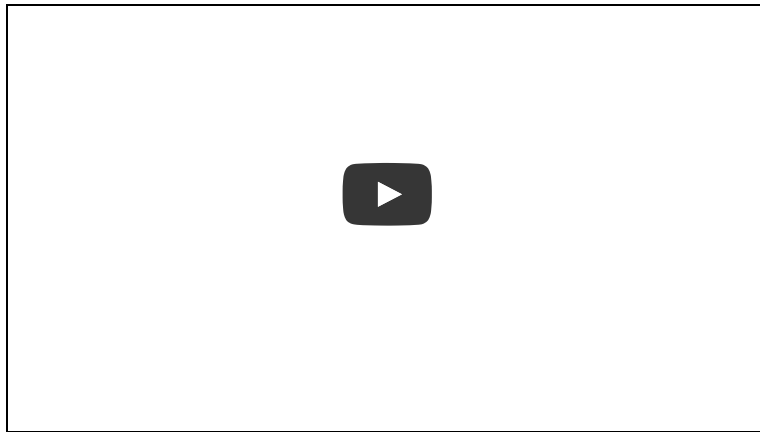
(http://www.huffingtonpost.com/2014/07/01/x-rated-math-words-dirty_n_5547923.html)

Worm's Entire Nervous System Captured Firing In Real Time (VIDEO)



(<http://www.nature.com/news/>) | By Sara Reardon

Posted: 05/20/2014 8:59 am EDT | Updated: 05/20/2014 9:59 am EDT



149

Share

(https://www.facebook.com/sharer/sharer.php?u=http%3A%2F%2Fwww.huffingtonpost.com%2F2014%2F05%2F20%2Fneurons-3d-imaging-video_n_5357205.html)

Researchers have for the first time imaged all of the neurons firing in a living organism, the nematode worm *Caenorhabditis elegans*. The achievement, reported today in Nature Methods shows how signals travel through the body in real time.



+

(<http://www.nature.com/nmeth/journal/vaop/ncurrent/full/nmeth.2964.html>)

MOST POPULAR

UFOs Spotted On Mars

(http://www.huffingtonpost.com/2014/07/06/mars-curiosity-rover-ufo-pictures_n_5538801.html?utm_hp_ref=mostpopular)

(http://www.huffingtonpost.com/2014/07/06/mars-curiosity-rover-ufo-pictures_n_5538801.html?utm_hp_ref=mostpopular)

Celebrities (And Their Bikinis) Are In The Holiday Spirit

(http://www.huffingtonpost.com/2014/07/04/celebrities-bikinis-fourth-of-july_n_5523177.html?utm_hp_ref=mostpopular)

(http://www.huffingtonpost.com/2014/07/04/celebrities-bikinis-fourth-of-july_n_5523177.html?utm_hp_ref=mostpopular)

23 Amazing Things America Would Be Missing Without Queer People

(http://www.huffingtonpost.com/2014/07/04/american-queer-people_n_5551782.html?utm_hp_ref=mostpopular)

(http://www.huffingtonpost.com/2014/07/04/american-queer-people_n_5551782.html?utm_hp_ref=mostpopular)

Miley Cyrus' Fourth Of July Got Weird

(http://www.huffingtonpost.com/2014/07/05/miley-cyrus-fourth-of-july_n_5559949.html?utm_hp_ref=mostpopular)

(http://www.huffingtonpost.com/2014/07/05/miley-cyrus-fourth-of-july_n_5559949.html?utm_hp_ref=mostpopular)

Rick Perry Won't Back Away From Obama Border Conspiracy Theory

Scientists [mapped the connections among all 302 of the nematode's neurons](http://rstb.royalsocietypublishing.org/content/314/1165/1) (http://rstb.royalsocietypublishing.org/content/314/1165/1) in 1986 — a first that has not been repeated with any other organism. But this wiring diagram, or 'connectome', does not allow researchers to determine the neuronal pathways that lead to a particular action. Nor does it allow researchers to predict what the nematode will do at any point in time, says neuroscientist Alipasha Vaziri of the University of Vienna. By providing a means of displaying signaling activity between neurons in three dimensions and in real-time, the new technique should allow scientists to do both.

Vaziri and his colleagues engineered *C. elegans* so that when a neuron fires and calcium ions pass through its cell membranes, the neuron lights up. To capture those signals, they imaged the whole worm using a technique called light-field deconvolution microscopy, which combines images from a set of tiny lenses and analyses them using an algorithm to give a high-resolution three-dimensional image. The researchers took as many as 50 images per second of the entire worm, enabling them to watch the neurons firing in the brain, ventral cord, and tail (see video).

From worms to fish

Next, the group applied the technique to the transparent larvae of the zebrafish (*Danio rerio*), imaging the entire brain as the fish responded to the odors of chemicals pumped into their water. They were able to capture the activity of about 5,000 neurons simultaneously (the zebrafish has about 100,000 total neurons).

Sponsored Links



New Way to Fight Diabetic Neuropathy

Natural remedy helps relieve pain - or your money back. Try it FREE*

www.NeuropathyTreatmentGroup.com

▶ “The connectome and activity are entirely complementary. You're not going to understand the nervous system by observing one or the other,” says Misha Ahrens, a neurobiologist at the Howard Hughes Medical Institute's Janelia Farm Research Campus in Ashburn, Virginia. Mapping how signals travel between neurons in conjunction with the connectome map will allow researchers to pinpoint the role of each individual cell. “There are no hidden variables

Buy a link here

anymore,” he says.

Last year, Ahrens' group imaged the activity of an entire zebrafish brain using a [microscopy technique that sends a sheet of light through the animal's tissue](http://www.nature.com/nmeth/journal/v10/n5/full/nmeth.2434.html) (http://www.nature.com/nmeth/journal/v10/n5/full/nmeth.2434.html). The new technique is much faster; it can allow researchers to take 100 times more images per second although it cannot show the activity of as many neurons simultaneously.

Neurobiologist and co-author Edward Boyden of the Massachusetts Institute of Technology in Cambridge says the next step is to use the technique to determine, and then to model, how neurons will respond to certain stimuli. He also wants to improve the technique's speed and resolution in order to image larger tissues such as mammalian brains.

This story originally appeared in [Nature News](http://www.nature.com/news) (http://www.nature.com/news).

ALSO ON HUFFPOST:



The Brain As Art

1 of 8 < >

http://www.huffingtonpost.com/2014/07/06/rick-perry-border_n_5561436.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/06/rick-perry-border_n_5561436.html?utm_hp_ref=mostpopular

Chile Releases Official Study on UFO Photos

http://www.huffingtonpost.com/leslie-kean/government-agency-in-chil_b_5558713.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/leslie-kean/government-agency-in-chil_b_5558713.html?utm_hp_ref=mostpopular

Pink Floyd Is Releasing A New Album

http://www.huffingtonpost.com/2014/07/06/pink-floyd-new-album-the-endless-river_n_5561346.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/06/pink-floyd-new-album-the-endless-river_n_5561346.html?utm_hp_ref=mostpopular

Kanye West Gets Boored During Yet Another Rant

http://www.huffingtonpost.com/2014/07/05/kanye-west-rant-boored_n_5559836.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/05/kanye-west-rant-boored_n_5559836.html?utm_hp_ref=mostpopular

Happy Sweet 16. Malia Obama!

http://www.huffingtonpost.com/2014/07/04/malia-obama-16-birthday_n_5557439.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/04/malia-obama-16-birthday_n_5557439.html?utm_hp_ref=mostpopular

Joan Rivers Says Barack Obama Is Gay. Uses Trans Slur Against Michelle Obama

http://www.huffingtonpost.com/2014/07/05/joan-rivers-obama_n_5560091.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/05/joan-rivers-obama_n_5560091.html?utm_hp_ref=mostpopular

Here's The Scaly Reason You'll Want To Stay Far Away From This Island

http://www.huffingtonpost.com/2014/07/04/brazil-snake-island-viper-venom_n_5552149.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/04/brazil-snake-island-viper-venom_n_5552149.html?utm_hp_ref=mostpopular

Postal Worker Caught On Video Hurling Packages Into Ravine

http://www.huffingtonpost.com/2014/07/05/postal-worker-throws-package-into-ravine-video_n_5560202.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/05/postal-worker-throws-package-into-ravine-video_n_5560202.html?utm_hp_ref=mostpopular

Viral Video Of Kids Greeting Classmate 'May Change The Way We Think About Each Other As Adults'

http://www.huffingtonpost.com/2014/07/04/viral-video-kids-welcome-tyler_n_5552602.html?utm_hp_ref=mostpopular

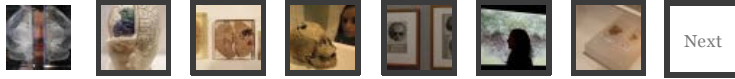
http://www.huffingtonpost.com/2014/07/04/viral-video-kids-welcome-tyler_n_5552602.html?utm_hp_ref=mostpopular

Michelle Obama Fights GOP On School Lunch Rules

http://www.huffingtonpost.com/2014/07/05/michelle-obama-school-lunch_n_5559925.html?utm_hp_ref=mostpopular

http://www.huffingtonpost.com/2014/07/05/michelle-obama-school-lunch_n_5559925.html?utm_hp_ref=mostpopular

Man Under Poverty Vow Wins \$259,800,000 Lottery



MORE: [Neurons Fire Real Time](#), [Neurons 3d Imaging](#), [Neurons Video](#), [Entire Organism's Neurons](#), [Neurons 3d](#), [Brain Science](#), [Neuron Video](#), [Neurons Imaged](#), [Nematode Neurons](#), [Nervous System Real Time](#), [Neurons Mapped](#)

[Suggest a correction](#)

ost&taboola_utm_medium=taboola&taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)



(<http://live.huffingtonpost.com/r/archiv-bishop-td-jakes-hates-about-mega-church-culture/536d2b6c78c90afa010003c9?cn=tbla>)

What Bishop T.D. Jakes 'Hates' About Mega-Church Culture

(<http://live.huffingtonpost.com/r/archiv-bishop-td-jakes-hates-about-mega-church-culture/536d2b6c78c90afa010003c9?cn=tbla>)



(<http://live.huffingtonpost.com/r/archiv-maker-will-pay-millions-to-suckers-w-ho-bought-its-shoes/536b9bb678c90a8f43000ad9?cn=tbla>)

FiveFingers Maker Will Pay Millions To Suckers Who Bought Its Shoes

(<http://live.huffingtonpost.com/r/archiv-maker-will-pay-millions-to-suckers-w-ho-bought-its-shoes/536b9bb678c90a8f43000ad9?cn=tbla>)



(<http://live.huffingtonpost.com/r/archiv-roberts-adorable-explanation-for-wearing-a-star-wars-dress/537236b078c90af0c3000069?cn=tbla>)

Julia Roberts' Adorable Explanation For Wearing A 'Star Wars' Dress

(<http://live.huffingtonpost.com/r/archiv-roberts-adorable-explanation-for-wearing-a-star-wars-dress/537236b078c90af0c3000069?cn=tbla>)



(http://mds.ricoh.com/blog/no_holes_in_utm_campaign=ContentSyndication&utm_source=taboola&utm_medium=taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)

3 Strategies to Avoid Exposure of Older System Security

(http://mds.ricoh.com/blog/no_holes_in_utm_campaign=ContentSyndication&utm_source=taboola&utm_medium=taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)



(http://landing-page-media.co.il/redirectBase-Trusteer-Enterprise.php?targeturl=http://www.zdnet.com/ibm-adds-java-lockdown-to-trusteer-apex-7000029738/&utm_source=taboola&utm_medium=taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)

The Rise Of Java App Exploitation And One Tech Company's An...

(http://landing-page-media.co.il/redirectBase-Trusteer-Enterprise.php?targeturl=http://www.zdnet.com/ibm-adds-java-lockdown-to-trusteer-apex-7000029738/&utm_source=taboola&utm_medium=taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)



(http://sport.de.msn.com/w-m-2014/fu%3%9fbal-w-m-2014-fans-weltweit?utm_source=taboola&utm_medium=taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)

World Cup 2014: Fans Around The World

(http://sport.de.msn.com/w-m-2014/fu%3%9fbal-w-m-2014-fans-weltweit?utm_source=taboola&utm_medium=taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)

(http://wwwtaboola.com/popup?utm_source=taboola&utm_medium=taboola_utm_content=ab_autosized-1r-organic_bold-bigger-titles:autosized-1r-organic:)

Around the Web

<http://www.nature.com/nmeth/journal/vaop/ncurrent/full/nmeth.2964.html>) Simultaneous whole-animal 3D imaging of neuronal activity using ...

<http://www.nature.com/nmeth/journal/vaop/ncurrent/full/nmeth.2964.html>)

<http://gizmodo.com/every-neuron-in-a-brain-recorded-in-3d-on-a-millisecond-1578578049>) Every Neuron in a Brain Recorded in 3D on a Millisecond Timescale (<http://gizmodo.com/every-neuron-in-a-brain-recorded-in-3d-on-a-millisecond-1578578049>)

<http://motherboard.vice.com/read/a-new-imaging-technique-made-a-3d-movie-of-a-whole-brain>) A New Imaging Technique Made a 3D Movie of an Entire Nervous System (<http://motherboard.vice.com/read/a-new-imaging-technique-made-a-3d-movie-of-a-whole-brain>)

(http://www.huffingtonpost.com/2014/07/04/roy-cockrum-powerball-jackpot_n_5558398.html?utm_hp_ref=mostpopular)

(http://www.huffingtonpost.com/2014/07/04/roy-cockrum-powerball-jackpot_n_5558398.html?utm_hp_ref=mostpopular)

WATCH: Neymar Out For World Cup With Fractured Vertebra

(http://www.huffingtonpost.com/2014/07/04/neymar-injured-back-brazil_n_5559007.html?utm_hp_ref=mostpopular)

(http://www.huffingtonpost.com/2014/07/04/neymar-injured-back-brazil_n_5559007.html?utm_hp_ref=mostpopular)


FOLLOW HUFFPOST


Email Address


Sign me up!


HuffPost Daily Brief New sletters

Get top stories and blog posts emailed to me each day..

 (<https://newsoffice.mit.edu/2014/illuminating-neuron-activity-3-d-0518>) [illuminating neuron activity in 3-D | MIT News Office \(https://newsoffice.mit.edu/2014/illuminating-neuron-activity-3-d-0518\)](https://newsoffice.mit.edu/2014/illuminating-neuron-activity-3-d-0518)

 (<http://arxiv.org/abs/1401.5333>) [Simultaneous whole-animal 3D-imaging of neuronal activity using ... \(http://arxiv.org/abs/1401.5333\)](http://arxiv.org/abs/1401.5333)

 (<http://www.ncbi.nlm.nih.gov/pubmed/24013820>) [Brain-wide 3D imaging of neuronal activity in Caenorhabditis ... \(http://www.ncbi.nlm.nih.gov/pubmed/24013820\)](http://www.ncbi.nlm.nih.gov/pubmed/24013820)

 (<http://www.redorbit.com/news/science/1113149580/imaging-living-brains-novel-three-dimensions-video-051914/>) [Neural Activity Of Living Brains Captured Using Novel 3D Video \(http://www.redorbit.com/news/science/1113149580/imaging-living-brains-novel-three-dimensions-video-051914/\)](http://www.redorbit.com/news/science/1113149580/imaging-living-brains-novel-three-dimensions-video-051914/)

Conversations

Huffington Post Search

[Advertise \(Http://Advertising.Aol.Com/Brands/Huffington-Post/\)](http://Advertising.Aol.Com/Brands/Huffington-Post/) |

[Log In \(/Users/Login/\)](#) | [Make HuffPost Your Home Page \(/Makehome/\)](#) |

[RSS \(/Syndication\)](#) | [Careers \(/Jobs/\)](#) | [FAQ \(/Faq/\)](#)

[User Agreement \(/Terms.Html\)](#) | [Privacy \(/Privacy/\)](#) | [Comment Policy \(/Comment/Policy/\)](#) |

[About Us \(/P/Huffington-Post.Html\)](#) | [About Our Ads \(Http://Adinfo.Aol.Com/About-Our-Ads/\)](#) |

[Contact Us \(/Contact/\)](#)

Copyright ©2014 TheHuffingtonPost.com, Inc. | "The Huffington Post" is a registered trademark of TheHuffingtonPost.com, Inc. All rights reserved.

Part of AOL Tech