



# WAMC NORTHEAST PUBLIC RADIO

Academic Minute

5:00 AM FRI OCTOBER 12, 2012

## Dr. Jeff Clune, Cornell University – Evolution and Embryology

Share Tweet +1 E-mail 0 Comments Print

By BRADLEY CORNELIUS

Listen



In today's Academic Minute, Dr. Jeff Clune of Cornell University reveals why the biology of life often takes a winding path through seemingly unnecessary developmental stages.

Jeff Clune is a visiting scientist in the Creative Machines Lab at Cornell University where he studies evolutionary computation, a technology that uses natural selection to bypass engineering and evolve artificial intelligence, robots, and physical designs. His work has been featured in a number of publications and he holds a Ph.D. from Michigan State University.

About Dr. Clune

### Dr. Jeff Clune – Evolution and Embryology

Something very strange happens as animals develop from single-celled embryos into fully formed adults. Many animal embryos, including our own, build tissue structures that they never use, and that later disappear. Scientists since Darwin have been puzzled by this phenomenon, wondering why these wasteful, unnecessary developmental steps are not removed by natural selection. It's comparable to a construction crew building a roller coaster, razing it, and building a skyscraper on the same ground. Why not just skip ahead and build the skyscraper?

A new technology allowed my colleagues and I to investigate this question. We recreate evolution inside a computer by making virtual worlds in which digital organisms compete with each other to have as many offspring as possible. Just like real organisms, the offspring sometimes have random mutations in their genomes that make them different from their parents. Usually such mutations hurt the offspring, but every once in a while they create an organism that is more fit, furthering the evolution of the species.

In a computer, evolution can happen extremely fast, so we get to watch populations evolve before our eyes. We discovered that seemingly unnecessary developmental steps are left in place to avoid disrupting a process that works. Evolution is essentially saying that if the shoe fits well enough, don't change a thing.

In retrospect, this makes a lot of sense. Each new embryonic structure is built in a delicate environment that consists of everything that has already developed. Mutations that alter that environment, such as by eliminating an unused structure, can disrupt later stages of development. An engineer would simply skip the unnecessary step, but evolution does not start over from scratch. It instead makes small adjustments to existing processes, and keeps whatever works.

This exciting new technology helped us settle an age-old question, and we learned that many structures that seem unnecessary make an important contribution after all.

TAGS: Academic Minute Cornell University

### Related Content:

- Academic Minute Dr. Norman Housley, University of Leicester – Richard III
Academic Minute Dr. Ernst De Mooij, University of Toronto – Exoplanet Atmosphere Detection

### RELATED PROGRAM

- The Academic Minute

Comments for this thread are now closed.

0 Comments

WAMC

Lo...

Sort by Best

Share Favorite

Be the first to comment.

Subscribe Add Disqus to your site

DISQUS



### Now Playing

WAMC ON AIR Music from the Hearts of Space 11:00 PM - 11:59 PM Listen Live Up Next 12:00 AM - 5:00 AM BBC World Service Full Schedule WAMC HD2

### Podcasts & RSS Feeds

All Content Podcast RSS View all podcasts & RSS feeds

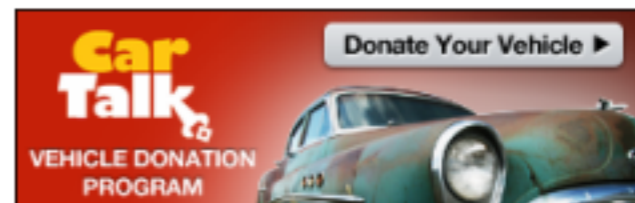
### Connect with Us

Find us on Facebook Follow us on Twitter

E-mail Newsletter Sign up now

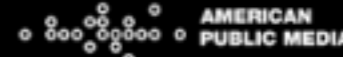
### Most Active Stories

- Uber, Airbnb Under Attack In Spain As Old And New Economies Clash
District Profile: Virginia's 7th Congressional
High-Speed Rail Project On Track In Western Mass.
Adirondack Village's Drinking Water Cited for Lead
Update: Albany 'Red Light Cameras'



Shop on amazon.com and help WAMC Don't forget to support our underwriters when you are shopping for gifts. But, if you shop on Amazon, click here and WAMC will get 8% back.

## WAMC



### EVENTS CALENDAR

- Aug 4 Summer Senior Day at the Chapman
Aug 4 Taste of Hudson Valley Bounty
Aug 4 A Conversation with Eddie Shapiro
Aug 5 Music for Children with Shelly Ley
Aug 5 Science Story Time

### WAMC NEWS

- New York News
Capital Region News
North Country News
Hudson Valley News
New England News
US News
World News
Arts / Culture
Science / Tech
Weather
Commentary / Opinion
Listener Comment Line

### ON AIR

- Schedule
Hosts
Programs
Program Guide
Roundtable
Vox Pop
Power of Words
In Conversation With...
Academic Minute
Earth Wise

### MOBILE

- WAMC Mobile Site

### LISTEN LIVE

- Listen live
Live Video
Podcasts

### SUPPORT

- Become a Member
Car Donation
Planned Giving
Underwriting
Underwriters Spotlight

WAMC 90.3 FM - Albany, NY WAMC 1400 AM - Albany, NY WAMK 90.9 FM - Kingston, NY WOSR 91.7 FM - Middletown, NY
WCEL 91.9 FM - Plattsburgh, NY WCAN 93.3 FM - Canajoharie, NY WANC 103.9 FM - Ticonderoga, NY WRUN 90.3 FM - Remsen-Utica, NY
WAMQ 105.1 FM - Great Barrington, MA WWES 88.9 FM - Mt. Kisco, NY WANZ 90.1 FM - Stamford, NY WANR 88.5 FM - Brewster, NY
103.9 FM - Beacon, NY 97.3 FM - Cooperstown, NY 96.5 FM - Ellenville, NY 102.1 FM - Highland, NY 97.1 FM - Hudson, NY
88.7 FM - Lake Placid, NY 106.3 FM - Middletown, NY 90.9 FM - Milford, PA 107.7 FM - Newburgh, NY 99.3 FM - Oneonta, NY
90.1 FM - Oneonta, NY 93.1 FM - Rensselaer-Troy, NY 107.1 FM - Warwick, NY 106.3 FM - Dover Plains, NY