



**Information for informal science educators,  
including a list of video stories available online at:  
[www.pbs.org/nova/sciencenow](http://www.pbs.org/nova/sciencenow)**

Document current as of 9/15/09

For more information contact  
NOVA scienceNOW Educational Outreach at:  
[getinvolved@wgbh.org](mailto:getinvolved@wgbh.org)

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the Howard Hughes Medical Institute, the Alfred P. Sloan Foundation, and public television viewers.

## Welcome to NOVA scienceNOW!

Our story begins with one of television's longest running programs: NOVA. Since its first season of weekly one-hour broadcasts in 1973, NOVA has engaged PBS viewers with award-winning, in-depth science stories. During that time NOVA has grown to encompass a robust library of media-rich resources for both the general public and the nation's educators. NOVA is now the most-watched primetime science series on American television, and the most-used video resource in high school classrooms.

In 2005, the WGBH Science Unit behind NOVA added a new PBS broadcast series to its productions. NOVA scienceNOW presents several different stories in each one-hour episode, reporting from the front lines of current science research. With an energetic pace, playful style, and popular host Neil DeGrasse Tyson, NOVA scienceNOW is particularly successful at reaching younger adult audiences, including teenagers and the 18-35 year old media demographic. From its inception NOVA scienceNOW has reached beyond television broadcasts with a continuously expanding treasure trove of online media resources, and educational outreach programs supporting formal and informal science educators, including the country's growing community of science cafés.

### NOVA scienceNOW resources

[www.pbs.org/nova/sciencenow](http://www.pbs.org/nova/sciencenow)

*Every NOVA scienceNOW story lives on beyond the initial PBS broadcast with its own page on this site. All stories can be watched here as streaming video, and many are downloadable. Each story is also accompanied by resources such as video extras, interactive features, interviews with researchers, classroom activities, and suggested links.*

[www.pbs.org/nova/mailling](http://www.pbs.org/nova/mailling)

*Sign up here to receive a weekly email with the latest news related to NOVA and NOVA scienceNOW. You can also "stay tuned" by following NOVA scienceNOW on Facebook, Twitter, iTunes, or YouTube.*

[www.pbs.org/nova/secretlife](http://www.pbs.org/nova/secretlife)

*NOVA's "The Secret Life of Scientists" is a web-only series that shows what happens when the lab coats come off. The series introduces a new scientist every two weeks with short videos revealing how their surprising secret lives fuel their science, and vice versa.*

[www.pbs.org/nova/teachers](http://www.pbs.org/nova/teachers)

*Teacher guides, classroom activities, viewing suggestions, show descriptions, student interactives, and suggestions from other teachers are all cataloged here. These features are also accessible from each story's individual webpage.*

[www.sciencecafes.org](http://www.sciencecafes.org)

*Science cafés are live events that feature a conversation between a scientist and the general public, usually held in casual venues such as pubs and restaurants. Visit this site to find a science café near you, learn more about presenting at cafés, and start your own event series.*

## Using NOVA scienceNOW in Informal Education Settings

NOVA scienceNOW stories are well-researched, timely, and short (under 15 minutes), making them ideal additions to a wide range of informal science education programs. Incorporating video into your programming will accommodate different learning styles, and succinctly provide background information. Video is often better than any other medium at helping an audience quickly grasp a topic's range of implications, whether by presenting a visual model of a difficult concept, transporting viewers to new places, or putting a human face on an issue.

### Working With NOVA scienceNOW

If you are interested in using NOVA scienceNOW resources in informal education settings, be sure to contact our Educational Outreach staff. We can help you determine which story is right for your purposes, mail you a free DVD of an episode, and connect you to regional partners that will help make your programming a success. Plus, we always love to hear how NOVA scienceNOW is being used.

Please contact us at: [getinvolved@wgbh.org](mailto:getinvolved@wgbh.org)

### Common Uses for NOVA scienceNOW Video

#### Science Cafés

*A short (3-5 minute) video clip pulled from a NOVA scienceNOW story related to the café topic is a great way to get a noisy crowd's attention and kick off café events. It can also ensure that your event controls the venue's televisions. More on using video in a science café event can be found at: [www.sciencecafes.org/video.html](http://www.sciencecafes.org/video.html)*

#### Public Outreach Events and Science Festivals

*A short video presentation before or during an event like a public lecture can help break up the event agenda and keep things lively. Looping video of NOVA scienceNOW at festivals and fairs will draw visitors to your booth and provide a starting point for conversation. Linking to relevant NOVA scienceNOW stories in pre-event correspondence can energize your audience's interest in a topic.*

#### Museum Galleries and Exhibitions

*Several science centers make use of downtime for televisions in exhibit galleries by presenting looping video of NOVA scienceNOW stories (made even easier by available captioning). Some museums have even incorporated NOVA scienceNOW video into permanent exhibitions.*

## Find the Video You Need

### Using this list

This document lists information on every story that NOVA scienceNOW has broadcast on PBS. These stories are listed by episode in chronological order starting with the most recent broadcast. Descriptions have been provided for most of the stories, which may help you quickly find what you are looking for with a word search.

Once you have found a story of interest be sure to visit the story's page online, where you can watch each story and explore many other resources related to story topics.

An electronic PDF version of this document (with live links) is available for download at: [www.sciencecafes.org/video.html](http://www.sciencecafes.org/video.html)

### Using the NOVA scienceNOW website

All stories are searchable at [www.pbs.org/nova/sciencenow](http://www.pbs.org/nova/sciencenow). Additionally, these stories are archived online in the following categories:

<b>By Original Broadcast Date:</b>	<a href="http://www.pbs.org/nova/sciencenow/archive/date.html">www.pbs.org/nova/sciencenow/archive/date.html</a>
<b>Alphabetically By Title:</b>	<a href="http://www.pbs.org/nova/sciencenow/archive/index.html">www.pbs.org/nova/sciencenow/archive/index.html</a>
<b>By Subject:</b>	
Health & Biosciences:	<a href="http://www.pbs.org/nova/sciencenow/archive/subject-bioscience.html">www.pbs.org/nova/sciencenow/archive/subject-bioscience.html</a>
Natural & Human Worlds:	<a href="http://www.pbs.org/nova/sciencenow/archive/subject-nature.html">www.pbs.org/nova/sciencenow/archive/subject-nature.html</a>
Physics & Space Science:	<a href="http://www.pbs.org/nova/sciencenow/archive/subject-physics.html">www.pbs.org/nova/sciencenow/archive/subject-physics.html</a>
Scientist Profiles:	<a href="http://www.pbs.org/nova/sciencenow/archive/subject-scientists.html">www.pbs.org/nova/sciencenow/archive/subject-scientists.html</a>
Technology & Math:	<a href="http://www.pbs.org/nova/sciencenow/archive/subject-technology.html">www.pbs.org/nova/sciencenow/archive/subject-technology.html</a>

### Obtaining a DVD

DVDs of NOVA scienceNOW video content are available to use for educational purposes only. This includes screenings of NOVA scienceNOW stories in both formal and informal educational settings as long as a fee is not charged specifically for the viewing. DVDs are recommended for group viewing, as they are more reliable than streaming video and provide better video quality than downloaded video.

To obtain a free DVD for use in informal education settings (such as science café events, public lectures, and museum galleries) please contact Education Outreach at: [getinvolved@wgbh.org](mailto:getinvolved@wgbh.org)

# NOVA scienceNOW

## Complete List of Broadcast Stories

### Season 4 (2009)

<b>Episode 8: 9/1/09</b> Earthquakes in the Midwest Profile: Sang-Mook Lee	<b>Episode 7: 8/25/09</b> Saving Hubble Update How Memory Works Gangster Birds	<b>Episode 6: 8/18/09</b> Public Genomes Algae Fuel Mystery of the Gakkell Ridge	<b>Episode 5: 7/28/09</b> Moon Smasher Secrets in the Salt Profile: Lonnie Thompson
<b>Episode 4: 7/21/09</b> The Science of Picky Eaters Smart Sea Lions, Talking Walruses Profile: Sangeeta Bhatia	<b>Episode 3: 7/14/09</b> Marathon Mouse Dinosaur Plague Profile: Franklin Chang-Diaz	<b>Episode 2: 7/7/09</b> Hunt for Alien Earths Profile: Maydianne Andrade Autism Genes	<b>Episode 1: 6/30/09</b> Diamond Factory Anthrax Investigation Auto-Tune Profile: Luis von Ahn

### Season 3 (2008)

<b>Episode 6: 7/30/08</b> Phoenix Mars Lander Brain Trauma Mammoth Mystery Profile: Judah Folkman	<b>Episode 5: 7/23/08</b> Leeches The Search for ET Stem Cells Breakthrough Profile: Edith Widder	<b>Episode 4: 7/16/08</b> Bird Brains Space Storms Profile: Yoky Matsuoka Smart Bridges
<b>Episode 3: 7/9/08</b> Saving Hubble First Primate Profile: Alfredo Quiñones-Hinojosa Killer Microbe	<b>Episode 2: 7/2/08</b> Personal DNA Testing Art Authentication Capturing Carbon Profile: Pardis Sabeti	<b>Episode 1: 6/25/08</b> Dark Matter Of Mice and Memory Profile: Hany Farid Wisdom of the Crowd

### Season 2 (2007)

<b>Episode 5: 7/24/07</b> T. Rex Blood? Epigenetics Kryptos Profile: Arlie Petters	<b>Episode 4: 7/10/07</b> Sleep CERN Emergence Profile: Julie Schablitsky	<b>Episode 3: 1/07</b> Aging Space Elevator Maya Profile: Bonnie Bassler	<b>Episode 2: 11/06</b> Mass Extinction 1918 Flu Papyrus Profile: Cynthia Brazeal	<b>Episode 1: 10/06</b> Asteroid Island of Stability Obesity Profile: Karl Iagnemma
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### Season 1 (2005 - 2006)

<b>Episode 5: 1/06</b> 10th Planet Twin Prime Conjecture Ivory-Billed Woodpecker Pandemic Flu Lab Meat? Stem Cells Update Stronger Hurricanes Profile: Tyler Curiel	<b>Episode 5: 10/05</b> Artificial Life Lightning Profile: Erich Jarvis Fish Surgery Don't Ask the Expert	<b>Episode 5: 7/05</b> Fuel Cells RNAi Fastest Glacier Profile: Brothers Chudnovsky	<b>Episode 5: 4/05</b> Little People of Flores T. Rex Profile: Naomi Halas Stem Cells Frozen Frogs	<b>Episode 5: 1/05</b> Mirror Neurons Hurricanes Profile: James McLurkin Booming Sands
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## Season 4, Episode 8

### Original Broadcast: 9/1/09

#### Earthquakes in the Midwest

Three massive earthquakes struck the American Midwest in 1811-12. Could it happen again?

[www.pbs.org/nova/sciencenow/0408/02.html](http://www.pbs.org/nova/sciencenow/0408/02.html)

Run time: 12:53

Subject area: Natural & Human Worlds

More info: *Some of the most dramatic earthquakes to strike North America haven't been in California or Alaska—they've hit in the heart of the country. In 1811 and 1812, a powerful string of quakes struck New Madrid, MO, with such force that they shifted the course of the Mississippi river and rang church bells in Boston. But were these earthquakes freak events, or could they happen again?*

#### Profile: Sang-Mook Lee

A South Korean geophysicist paralyzed from the neck down defies stereotypes of the disabled.

[www.pbs.org/nova/sciencenow/0408/03.html](http://www.pbs.org/nova/sciencenow/0408/03.html)

Run time: 10:54

Subject area: Natural & Human Worlds, Scientist Profiles

More info: *Sang-Mook Lee, Assistant Professor of Marine Geology and Geophysics at Seoul National University, is paralyzed from the neck down. But this hasn't slowed him down: he continues to teach and focus on his work on tectonic plates and the formation of the world's oceans, and spends his free time advocating for disabled people's rights and teaching others with disabilities.*

## Season 4, Episode 7

### Original Broadcast: 8/25/09

#### Saving Hubble Update

Two teams of spacewalkers take on unprecedented challenges to repair the world's most beloved telescope. *Update of original 7/9/08 story.*

[www.pbs.org/nova/sciencenow/0407/01.html](http://www.pbs.org/nova/sciencenow/0407/01.html)

Run time: 15:05

Subject area: Physics & Space Science

More info: *The Hubble Space Telescope—an orbiting eye on the universe that has greatly advanced our knowledge of the cosmos—is in need of repairs never intended to be performed in orbit. Host Neil de Grasse Tyson take us to the NASA Goddard Space Flight Center, where the cameras are given special access to the astronauts training for one of the most complex missions ever attempted.*

#### How Memory Works

Neurobiologists are honing in on how memories form, and then finding ways to erase them.

[www.pbs.org/nova/sciencenow/0407/02.html](http://www.pbs.org/nova/sciencenow/0407/02.html)

Run time: 10:15

Subject area: Health & Biosciences

More info: *For much of his life Henry Molaison was unable to form new memories. Suffering from severe epilepsy, Molaison underwent a risky treatment that fixed his epilepsy but caused severe memory impairment. Subsequently, Henry allowed dozens of researchers to question and test him. Now, though no longer living, Molaison's brain is the subject of still more scrutiny, helping to create the most detailed map of memory in the brain yet.*

#### Gangster Birds

A mafia-style protection racket may be in operation in our backyards.

[www.pbs.org/nova/sciencenow/0407/03.html](http://www.pbs.org/nova/sciencenow/0407/03.html)

Run time: 11:30

Subject area: Natural & Human Worlds

More info: *Watch out: cowbirds might make you an offer you can't refuse. These common backyard birds have a dark secret, and ecologist Jeff Hoover has stumbled on a clue that might unravel the most brutal reign of terror in the avian world.*

## Season 4, Episode 6

### Original Broadcast: 8/18/09

#### Public Genomes

Thousands of people are signing up to post their DNA sequences on the Internet, for all to see. Are they crazy? *Builds off of original 7/2/08 story.*

[www.pbs.org/nova/sciencenow/0406/01.html](http://www.pbs.org/nova/sciencenow/0406/01.html)

Run time: 13:22

Subject area: Health & Biosciences

More info: *To test or not to test? NOVA scienceNOW revisits the question Neil deGrasse Tyson asked himself last season, as he pondered whether to get a personal genetic profile that would predict his chances of contracting one of several serious diseases. In the interest of science journalism, Neil submitted his spit for analysis. But would you?*

#### Algae Fuel

In the search for alternatives to gasoline, are algae the answer?

[www.pbs.org/nova/sciencenow/0406/02.html](http://www.pbs.org/nova/sciencenow/0406/02.html)

Run time: 10:57

Subject area: Natural & Human Worlds

More info: *What if you could generate useable biofuels without the problems associated with corn ethanol or plant-based processes, that didn't use arable land or fresh water, that didn't rely on foodstuffs, that cost very little, and could be "tuned" to produce hydrogen? Well, there is such a thing. It's algae, and it just may be our biofuel future.*

#### Mystery of the Gakkel Ridge

Scientists journeying deep beneath Arctic sea ice discover a world never before seen.

[www.pbs.org/nova/sciencenow/0406/03.html](http://www.pbs.org/nova/sciencenow/0406/03.html)

Run time: 8:01

Subject area: Natural & Human Worlds

More info: *Stretching more than a thousand miles deep beneath the Arctic Ocean, Gakkel Ridge is an eerie undersea landscape of volcanoes, hydrothermal plumes, and exotic creatures. But though Gakkel Ridge may be unique on Earth, it bears an enticing resemblance to Europa, one of Jupiter's many moons. Could exploring Gakkel bring us one step closer to finding out if Europa might host life?*

## Season 4, Episode 5

### Original Broadcast: 7/28/09

#### **Moon Smasher**

A NASA satellite called LCROSS heads to the moon in the hope of finding buried water.

[www.pbs.org/nova/sciencenow/0405/01.html](http://www.pbs.org/nova/sciencenow/0405/01.html)

Run time: 10:50

Subject area: Physics & Space Science

More info: *Tag along with a team of scientists at NASA who will smash two SUV-sized rockets onto the lunar surface and unleash a debris cloud to study with LCROSS (Lunar Crater Observation and Sensing Satellite). The data could provide the key to understanding how to build a permanent base on the moon, accelerating a new "race to the moon."*

#### **Secrets in the Salt**

Salt deposits that formed 250 million years ago hold tantalizing hints of early life.

[www.pbs.org/nova/sciencenow/0405/02.html](http://www.pbs.org/nova/sciencenow/0405/02.html)

Run time: 11:50

Subject area: Natural & Human Worlds

More info: *In 2008, in a tunnel deep below the desert near Roswell, New Mexico, microbiologist Jack Griffith made a phenomenal discovery—the oldest known organic molecules on earth. A year later, Griffith will push the hunt for the earliest macromolecules ever further as he searches in 400 million year old salt deposits below Detroit City.*

#### **Profile: Lonnie Thompson**

A climatologist struggles to save ancient history preserved in ice that is now melting.

[www.pbs.org/nova/sciencenow/0405/04.html](http://www.pbs.org/nova/sciencenow/0405/04.html)

Run time: 11:31

Subject area: Natural & Human Worlds; Scientist Profiles

More info: *A recent winner of the prestigious National Medal of Science, Thompson has been drilling ice cores at high elevations in the tropics since 1976. Why the tropics? Many fellow scientists were skeptical until Thompson showed that such cores preserve a detailed, millennia-old record of climate shifts in the most populous regions of the world.*

## Season 4, Episode 4

### Original Broadcast: 7/21/09

#### **The Science of Picky Eaters**

Don't like broccoli? Your DNA may explain why.

[www.pbs.org/nova/sciencenow/0404/01.html](http://www.pbs.org/nova/sciencenow/0404/01.html)

Run time: 12:45

Subject area: Health & Biosciences

*More info: Neil deGrasse Tyson sets out to find out more about the science behind our sense of taste—and discovers that you can't understand taste without also getting into smell. Just when he thinks he's got it, HHMI scientist Bob Margolske throws him a curve ball: receptors on taste cells are turning up in parts of the body no one ever imagined finding them!*

#### **Smart Sea Lions and Talking Walruses**

Marine mammals are wowing researchers with more than just circus tricks.

[www.pbs.org/nova/sciencenow/0404/03.html](http://www.pbs.org/nova/sciencenow/0404/03.html)

Run time: 10:35

Subject area: Natural & Human Worlds

*More info: Sea lions and walruses are often dismissed as circus clowns, but new evidence shows that these animals are remarkably intelligent. Scientists have found sea lions to be capable of higher order reasoning that few other animals have demonstrated, and studies of walrus and sea lion vocal abilities are also shedding light on the evolutionary roots of human language.*

#### **Profile: Sangeeta Bhatia**

Intrigued by the idea of artificial organs, a biomedical engineer uses computer-chip technology to craft tiny livers.

[www.pbs.org/nova/sciencenow/0404/04.html](http://www.pbs.org/nova/sciencenow/0404/04.html)

Run time: 11:17

Subject area: Health & Biosciences, Scientist Profiles

*More info: Sangeeta Bhatia comes from a long line of successful women. Her aunt in India went to medical school and her mother was the first woman in India to receive an MBA. Now with her own PhD in Medical Engineering, and an MD, Bhatia is a tissue engineer at MIT with a focus on the liver and cancer treatment, and she's started an outreach program to get young girls into labs—wearing space suits, working with lasers, and loving science.*

## Season 4, Episode 3

### Original Broadcast: 7/14/09

#### Marathon Mouse

With an "exercise pill," researchers turn couch-potato rodents into champion runners.

[www.pbs.org/nova/sciencenow/0403/03.html](http://www.pbs.org/nova/sciencenow/0403/03.html)

Run time: 12:27

Subject area: Health & Biosciences

More info: *After studying mice his team managed to genetically alter for heightened endurance, Ron Evans has found two drugs that have the same effect as gene modification. Now that both drugs have been approved by the FDA for other uses, will their promise—helping those with little to no muscle mass, such as kids with muscular dystrophy or the frail elderly, to build strength and endurance—be overshadowed by potential athlete abuse?*

#### Dinosaur Plague

Insects caught in amber spark a controversial theory about what killed the dinosaurs.

[www.pbs.org/nova/sciencenow/0403/01.html](http://www.pbs.org/nova/sciencenow/0403/01.html)

Run time: 15:05

Subject area: Natural & Human Worlds

More info: *Renowned paleontologist George Poinar—whose study of extinct creatures exquisitely preserved in amber partly inspired Jurassic Park—has announced his discovery of multiple clues to parasitic pandemics that could have been just as instrumental in wiping out the dinosaurs as the hypothesized asteroid impact.*

#### Profile: Franklin Chang-Díaz

The first Latino-American astronaut is also a scientist designing a new generation of plasma-powered space vehicles.

[www.pbs.org/nova/sciencenow/0403/04.html](http://www.pbs.org/nova/sciencenow/0403/04.html)

Run time: 15:52

Subject area: Physics & Space Science; Scientist Profiles

More info: *The son of a Spanish Costa Rican mother and a Chinese and Costa Rican father, Chang-Díaz became the first astronaut who was a naturalized citizen. He also holds the record for the most space flights—and he's designed a revolutionary new rocket that just might power a new generation of space explorers.*

## Season 4, Episode 2

### Original Broadcast: 7/7/09

#### Hunt for Alien Earths

Astronomers may be on the brink of finding Earth-like planets beyond our solar system.

[www.pbs.org/nova/sciencenow/0402/01.html](http://www.pbs.org/nova/sciencenow/0402/01.html)

Run time: 12:42

Subject area: Physics & Space Science

More info: *NOVA scienceNOW visits astronomers working to find "another Earth" in our galaxy with a new planet-hunting machine that will soon be operational: the Kepler telescope. This and other ingenious new techniques could finally answer the age-old question: Are we alone?*

#### Profile: Maydianne Andrade

By peering into the sex lives of Australian redback spiders, this evolutionary biologist has shown the upside of cannibalism.

[www.pbs.org/nova/sciencenow/0402/03.html](http://www.pbs.org/nova/sciencenow/0402/03.html)

Run time: 9:44

Subject area: Natural & Human Worlds, Scientist Profiles

More info: *Some arachnophobes might see Maydianne Andrade's career as a horror film (her favorite kind), but Andrade can't imagine how she would spend her days and nights if not studying the cannibalistic behavior of the Australian redback spider. And she believes the redback can teach us about how sexual selection, social interactions, and ecological conditions interact to affect the evolution of mating systems.*

#### Autism Genes

Researchers have begun to zero in on genes that might be responsible for autism.

[www.pbs.org/nova/sciencenow/0402/04.html](http://www.pbs.org/nova/sciencenow/0402/04.html)

Run time: 12:51

Subject area: Health & Biosciences

More info: *Rudy Tanzi, a pioneer in discovering genes for Alzheimer's disease, is turning his attention to autism. Using gene chips that can scan up to a million genetic markers across the entire human genome, Tanzi and others are on the hunt for the genetic key to a heartbreaking disease that seems to come out of nowhere, and yet affects millions of children and their families.*

## Season 4, Episode 1

### Original Broadcast: 6/30/09

#### Diamond Factory

Visit a laboratory where entrepreneurs are growing perfectly pure diamonds.

[www.pbs.org/nova/sciencenow/0401/01.html](http://www.pbs.org/nova/sciencenow/0401/01.html)

Run time: 14:35

Subject area: Natural & Human Worlds

More info: *A blindfolded Neil deGrasse Tyson is led to a top-secret "diamond farm" to investigate breakthroughs in the engineering of artificial diamonds. Indistinguishable from the real thing, these glittering creations may one day adorn more than ring fingers. They could replace silicon transistors in everything from supercomputers to high-speed electric trains.*

#### Anthrax Investigation

The new science of microbial forensics reveals the source of the anthrax used in the deadly attacks of 2001.

[www.pbs.org/nova/sciencenow/0401/02.html](http://www.pbs.org/nova/sciencenow/0401/02.html)

Run time: 14:10

Subject area: Health & Biosciences

More info: *Using an ingenious technique that highlights key mutations in a strain of anthrax, researchers can use genetic "fingerprinting" to trace the source of the strain. This revolutionary technique also has the potential to find the source microbe responsible for anything from food-borne poisonings to deadly health epidemics.*

#### Auto-Tune

Can't carry a tune? Andy Hildebrand's pitch-correction software can help you sing like a star.

[www.pbs.org/nova/sciencenow/0401/03.html](http://www.pbs.org/nova/sciencenow/0401/03.html)

Run time: 6:51

Subject area: Technology & Math

More info: *NOVA scienceNOW talks to the engineers behind Auto-Tune, the pitch correction software that turns sour notes into sweet ones—and which is used by everyone from Madonna to Snoop Dogg. But can Auto-Tune turn host Neil deGrasse Tyson into a singing star?*

#### Profile: Luis von Ahn

A computer scientist finds novel ways to stop spammers and harness the brainpower of millions of people.

[www.pbs.org/nova/sciencenow/0401/04.html](http://www.pbs.org/nova/sciencenow/0401/04.html)

Run time: 11:03

Subject area: Technology & Math; Scientist Profiles

More info: *From growing up in Guatemala, where his family owned a candy factory, human computation expert Luis von Ahn, 30, went on to become a professor of computer science at Carnegie Mellon University, where he works to combine the best skills of both humans and computers, capitalizing on the countless hours that humans waste at computers, furthering the intelligence of computers, and hopefully benefiting humankind.*

## Season 3, Episode 6

### Original Broadcast: 7/30/08

#### Phoenix Mars Lander

NASA's latest robot has already found frozen water and is looking for more signs that the Red Planet could support life.

[www.pbs.org/nova/sciencenow/0306/01.html](http://www.pbs.org/nova/sciencenow/0306/01.html)

Run time: 11:33

Subject area: Physics & Space Science

More info: *"Follow the water!" That's the science strategy for exploring Mars. For four years two rovers have been investigating parts of the planet where scientists believe water was abundant billions of years ago. Now a Mars lander named Phoenix is sitting just centimeters above water ice buried near Mars' north pole. For the first time ever, a spacecraft is getting its hands wet, so to speak, as Phoenix digs into the permafrost to obtain samples of martian dust, dirt, and ice in a search for evidence that Mars could perhaps sustain microbial life. Mars enthusiast and host Neil deGrasse Tyson visits the Phoenix science operations center at the University of Arizona to get involved in this "groundbreaking" event, and heads to the desert to perform a few Phoenix-style experiments of his own.*

#### Brain Trauma

Even so-called "mild" head injuries turn out to be anything but.

[www.pbs.org/nova/sciencenow/0306/02.html](http://www.pbs.org/nova/sciencenow/0306/02.html)

Run time: 11:19

Subject area: Health & Biosciences

More info: *Knocks to the head are the occasion for humor in our culture: in cartoons, sports replays, and YouTube videos. But even minor head injuries are serious business. A concussion may leave no trace on a conventional MRI scan, but can cause permanent memory loss, attention problems, and depression. The culprit may be tears in the brain's white matter, a complex network of connections that link the different processing centers of the brain. But athletes, bicyclists, motorists, soldiers, and others at risk of concussion take warning: there is still no way to reverse the damage from a blow to the head, no matter how funny it may seem to others.*

#### Mammoth Mystery

A pair of mammoth skeletons is found locked together by their tusks. What happened?

[www.pbs.org/nova/sciencenow/0306/03.html](http://www.pbs.org/nova/sciencenow/0306/03.html)

Run time: 11:38

Subject area: Natural & Human Worlds

More info: *In 1962, paleontologists uncovered the rarest of Ice Age fossils in the Nebraska badlands: two complete male mammoths locked in a death grip by their 12-foot-long tusks. But what made them fight? And why did they die together? The fatal sequence of events has been a mystery for more than 40 years. NOVA scienceNOW explores the details of Clash of the Mammoths, two battling titans entangled in mortal combat—the only discovery of its kind in the world. Following forensic clues, paleontologists determine the sex and age of the mammoths, their eating patterns, the time of year of their deadly battle, their injuries, and how their violent clash doomed them.*

#### Profile: Judah Folkman

Once scorned for his ideas about how cancer grows, the late Judah Folkman is now hailed as a visionary.

[www.pbs.org/nova/sciencenow/0306/04.html](http://www.pbs.org/nova/sciencenow/0306/04.html)

Run time: 11:00

Subject area: Health & Biosciences; Scientist Profiles

More info: *Judah Folkman wasn't always considered a trailblazer. Forty years ago his idea that cancer tumors secrete a substance that promotes new blood vessel growth, or angiogenesis, was regarded as seriously misguided by many medical researchers. But Dr. Folkman proved his theory and began the difficult search for a drug that turns angiogenesis off and that can treat cancer by cutting off its blood supply. Today the hunch that got Dr. Folkman started decades ago has blossomed into an exciting field.*

## Season 3, Episode 5

### Original Broadcast: 7/23/08

#### Leeches

A century after falling out of favor among doctors, medicinal leeches are back in hospitals, sucking away on patients' wounds.

[www.pbs.org/nova/sciencenow/0305/01.html](http://www.pbs.org/nova/sciencenow/0305/01.html)

Run time: 11:01

Subject area: Health & Biosciences; Natural & Human Worlds

More info: *Leeches, those innocent bloodsuckers, have been bad-mouthed to the point that they've become synonymous with obnoxious freeloaders. Even host Neil deGrasse Tyson gets creeped out while wading through leech-infested waters. But leeches are much less dangerous than mosquitoes and ticks as disease spreaders. Although leeches became notoriously overused in nineteenth century medicine, they've orchestrated something of a comeback, and are today used when reattached fingers and toes become engorged with excess blood that must be drained off.*

#### The Search for ET

Astronomers have their radio telescopes tuned to receive signals from alien worlds. But is anybody out there?

[www.pbs.org/nova/sciencenow/0305/02.html](http://www.pbs.org/nova/sciencenow/0305/02.html)

Run time: 11:18

Subject area: Physics & Space Science; Natural & Human Worlds; Technology & Math

More info: *In 1960 an inquisitive astronomer named Frank Drake aimed a radio telescope at a couple of nearby stars and started listening. Nearly 50 years later we're still listening, and SETI—the Search for Extra Terrestrial Intelligence—has just expanded big time to begin the systematic survey of millions of star systems for signs of advanced civilizations. Jill Tarter, director of the Center for SETI Research, explains that making a judgment about the existence of alien cultures based on the last 40 years of observations would be like trying to determine if there are fish in the ocean by looking in a single glass of sea water. And while no alien signals have yet turned up the new SETI search has only begun!*

#### Stem Cells Breakthrough

Three separate teams overcome a biomedical hurdle—creating stem cells without the use of human embryos.

[www.pbs.org/nova/sciencenow/0305/03.html](http://www.pbs.org/nova/sciencenow/0305/03.html)

Run time: 13:39

Subject area: Health & Biosciences; Technology & Math

More info: *In the latest update on the controversial subject of stem cell research, NOVA scienceNOW explores an exciting and potentially revolutionary new development. Japanese researcher Shinya Yamanaka has discovered how to take an ordinary skin cell from an adult, turn back its genetic clock, and transform it into the equivalent of an embryonic stem cell. Yamanaka calls these cells Induced Pluripotent Stem (iPS) cells, and their crucial feature is that they are created without embryos.*

#### Profile: Edith Widder

Meet a marine biologist and explorer who has engineered new ways to spy on deep-sea creatures.

[www.pbs.org/nova/sciencenow/0305/04.html](http://www.pbs.org/nova/sciencenow/0305/04.html)

Run time: 9:05

Subject area: Health & Biosciences; Natural & Human Worlds; Scientist Profiles

More info: *Go for a deep-sea dive with a scientist who is seeing things never before recorded on the ocean floor. Edith Widder is a specialist in marine bioluminescence, the biochemical emission of light by ocean animals that can light up the murky depths to an astonishing degree. Widder is doing some lighting of her own with an innovative camera system called the "Eye in the Sea" that uses a wavelength of light invisible to sea creatures to catch them unaware. On its first test the "Eye" recorded a squid not yet known to science.*

## Season 3, Episode 4

### Original Broadcast: 7/16/08

#### Bird Brains

Clues to the origins of human language are turning up in the brains of birds.

[www.pbs.org/nova/sciencenow/0304/01.html](http://www.pbs.org/nova/sciencenow/0304/01.html)

Run time: 12:47

Subject area: Health & Biosciences; Natural & Human Worlds

More info: *Birds have an undeserved reputation for low brainpower. But in fact they produce one of the most glorious phenomena in nature: bird songs. How do their brains do it? And what does this skill tell us about the evolution of another remarkable phenomenon, human language? NOVA scienceNOW visits labs where research on an Australian songbird called the zebra finch is shedding light on babbling in babies, stuttering in birds as well as humans, and the neuronal processes that lead from understanding sounds, whether songs or sentences, to producing them. The similarity between bird song and human speech and the evolution of human language may lie in our genes, including an intriguing gene called FOXP2 that is shared by a wide range of creatures.*

#### Space Storms

Behind the dazzling display of the aurora borealis are space storms that could turn the lights off here on Earth.

[www.pbs.org/nova/sciencenow/0304/02.html](http://www.pbs.org/nova/sciencenow/0304/02.html)

Run time: 9:51

Subject area: Physics & Space Science; Natural & Human Worlds

More info: *The northern lights are glorious, but like many beautiful things they hold a mystery: What causes them? Finding the answer is not just an exercise in satisfying scientific curiosity. The dance of the northern lights masks a growing danger, since the most energetic displays are associated with violent space weather—the energetic flow of radiation, magnetic fields, and charged particles from the Sun. These storms can disable satellites or even kill astronauts who happen to be in deep space. And given our increasing reliance on space-based technologies, we need to learn to predict space weather just as we can forecast Earth weather. But the pressure is on—there's a storm brewing in the next few years, which will mark the peak in the Sun's 11-year cycle of maximum activity.*

#### Profile: Yoky Matsuoka

A former tennis prodigy aims to create advanced prosthetic limbs controlled by human thought.

[www.pbs.org/nova/sciencenow/0304/03.html](http://www.pbs.org/nova/sciencenow/0304/03.html)

Run time: 12:00

Subject area: Technology & Math; Scientist Profiles

More info: *Growing up in Japan, Yoky Matsuoka was on her way to becoming a world-class tennis player. But in daily practice it was hard to find a regular partner. So Matsuoka came up with the idea of building her own: A robotic player that would never get tired. Injuries put a hold on her tennis dreams, but not on her interest in robotics. Twenty years later, Matsuoka is now a leader in the emerging field of neurobotics and is at work creating robot technology that can help disabled people.*

#### Smart Bridges

Can we engineer bridges that tell us what's wrong with them before it's too late?

[www.pbs.org/nova/sciencenow/0304/04.html](http://www.pbs.org/nova/sciencenow/0304/04.html)

Run time: 9:52

Subject area: Technology & Math

More info: *Ever since the sudden collapse of the Minneapolis Interstate 35 bridge, millions are now nervous about crossing long highway spans. In a nation abounding with aging bridges, what can be done to avert the next catastrophe? One technique being investigated at the University of California San Diego probes bridge supports with ultrasonic sound waves, searching for "sour notes" that signal damaged metal. Meanwhile, researchers at the University of Michigan are using nanotechnology to create a coating that works like human skin to detect structural damage beneath its surface.*

## Season 3, Episode 3

### Original Broadcast: 7/9/08

#### Saving Hubble

Two teams of spacewalkers take on the risky mission of reviving the ailing Space Telescope. Updated on 8/25/09 broadcast.

[www.pbs.org/nova/sciencenow/0303/01.html](http://www.pbs.org/nova/sciencenow/0303/01.html)

Run time: 13:00

Subject area: Physics & Space Science; Technology & Math

More info: *Launched in 1990, Hubble has been repaired on several previous Space Shuttle flights, but there has never been a renovation project quite like the one that now faces this old telescope. Host Neil deGrasse Tyson travels to the NASA Goddard Space Flight Center, where he is given special access to the astronauts who are training for one of the most complex missions ever attempted. During earlier Hubble servicing missions, astronauts focused on replacing modular units. Veteran spacewalker Michael Massimino describes the drill: "Open it up, pull a big thing out, and put a big thing in." This time Massimino and his crewmates will be doing that, but they'll also be struggling with scores of tiny screws as they try to fix crucial equipment that was not designed to be repaired in orbit.*

#### First Primate

Our most distant primate ancestors, which took the stage shortly after the dinosaurs left it, were tree-dwellers the size of mice.

[www.pbs.org/nova/sciencenow/0303/02.html](http://www.pbs.org/nova/sciencenow/0303/02.html)

Run time: 13:04

Subject area: Natural & Human Worlds

More info: *Could one of our early ancestors have been a tree-climbing creature the size of a mouse? If University of Florida paleontologist Jonathan Bloch is correct, we may have to downsize our image of what it means to be a primate—the biological order that includes humans, apes, monkeys, and comparable mammals. NOVA scienceNOW goes into the field with Bloch to search for fossil remains of our missing relatives from the shadowy period after the catastrophe that doomed the dinosaurs. Bloch and his team assemble three intriguing specimens and enlist the help of scientists from Canada and Yale to assess the mounting evidence found in these extraordinary finds.*

#### Profile: Alfredo Quiñones-Hinojosa

He jumped the fence from Mexico to work as a farmhand and ended up a leading brain surgeon.

[www.pbs.org/nova/sciencenow/0303/03.html](http://www.pbs.org/nova/sciencenow/0303/03.html)

Run time: 10:28

Subject area: Health & Biosciences; Scientist Profiles

More info: *It's been two decades since Alfredo Quiñones-Hinojosa jumped the border fence separating Mexico and the U.S. and established himself as a farm worker in southern California. His goal: to earn enough to feed his family. Today he's achieved considerably more. "Dr. Q," as his patients know him, is an assistant professor of neurosurgery and oncology at Johns Hopkins University, where he is in hot pursuit of a treatment for brain cancer. By day, he operates on tricky brain cancer cases. By night, he researches how tumors grow. NOVA scienceNOW visits the young brain surgeon at work and at home to reveal a moving and remarkable personal story.*

#### Killer Microbe

A relatively benign bug becomes a highly lethal pathogen, known to U.S. soldiers as Iraqibacter.

[www.pbs.org/nova/sciencenow/0303/04.html](http://www.pbs.org/nova/sciencenow/0303/04.html)

Run time: 8:29

Subject area: Health & Biosciences

More info: *There's a killer in Iraq attacking injured soldiers, but it doesn't carry a gun. The culprit is a deadly microbe that the soldiers call Iraqibacter. The virulent drug-resistant bug has been showing up predominately in military hospitals, but has also been brought back to hospitals in America. NOVA scienceNOW heads into the lab with some of the microbiologists and geneticists studying how this bug works. Viewers will learn about this bug's secret weapon and researchers' efforts to understand how bacteria communicate with each other and evolve.*

## Season 3, Episode 2

### Original Broadcast: 7/2/08

#### Personal DNA Testing

Genetic testing to assess risk factors for a handful of serious illnesses is now commercially available. But is it a good idea? See *similar story broadcast on 8/18/09*.

[www.pbs.org/nova/sciencenow/0302/01.html](http://www.pbs.org/nova/sciencenow/0302/01.html)

Run time: 12:00

Subject area: Health & Biosciences; Technology & Math

More info: *To test or not to test? That's the question that faces host Neil deGrasse Tyson as he ponders whether to get a personal genetic profile that will predict his chances of contracting one of several serious diseases. How do such tests work and how valid are they? Furthermore, what do you do if you get bad news—or good news? Some researchers argue that the causes of common ailments are so complex and poorly understood that the genetic tests are, at least for now, almost impossible to interpret. But what about the future? Before long, everyone will be able to sequence his or her entire genome. The hope is that doctors may one day be able to use our genomes to predict exactly who is likely to get sick and what to do to prevent it.*

#### Art Authentication

See how clever computer algorithms can distinguish a master fake from a masterpiece.

[www.pbs.org/nova/sciencenow/0302/02.html](http://www.pbs.org/nova/sciencenow/0302/02.html)

Run time: 12:40

Subject area: Physics & Space Science; Technology & Math

More info: *Vincent van Gogh has inspired several talented artists to turn their hands to forgery. Can computers be used to identify which works are really his? To find out, NOVA scienceNOW commissioned an expert to make a meticulous copy of a van Gogh painting, and then challenged three different computer teams to see if they could find the imitation in a group that included five genuine van Goghs. Check out NOVA scienceNOW's unique experiment to see whether digital scans plus clever algorithms can unmask the fake.*

#### Capturing Carbon

An eighth-grader's science fair project prompts her scientist father to develop a new way to pull excess carbon dioxide out of the atmosphere.

[www.pbs.org/nova/sciencenow/0302/03.html](http://www.pbs.org/nova/sciencenow/0302/03.html)

Run time: 12:06

Subject area: Natural & Human Worlds; Technology & Math

More info: *Can an eighth grader's science fair project show the way to dealing with rising levels of carbon dioxide in the atmosphere? Claire Lackner may have been onto something big when she used an aquarium pump to circulate air through a solution of sodium hydroxide, capturing much of the carbon dioxide in her air sample. The simple experiment got Claire's father, Klaus, thinking: "Could such a principle be applied on a mass scale?" A decade later, Dr. Lackner has helped form a green company that is testing a secret product that may fulfill the dream of creating an artificial tree that can absorb carbon dioxide directly from the air. NOVA scienceNOW explores the daunting challenges that have to be met before such a technology can begin to make a dent in atmospheric carbon dioxide.*

#### Profile: Pardis Sabeti

By night she's a rocker. By day, she's a Harvard geneticist tracking the evolution of the human genome.

[www.pbs.org/nova/sciencenow/0302/04.html](http://www.pbs.org/nova/sciencenow/0302/04.html)

Run time: 8:00

Subject area: Health & Biosciences; Scientist Profiles

More info: *By day, Pardis Sabeti is an assistant professor at Harvard University and a researcher in evolutionary genetics. By night, she and her band Thousand Days play the clubs. The group's EP "Headlight Waves" won honorable mention in the Billboard World Song Competition. Away from the music scene, she has traveled to Africa to study how the malaria parasite interacts with its human hosts. She is making use of an ingenious algorithm, which she developed to understand how the genomes of humans and the malaria parasite change over time.*

## Season 3, Episode 1

### Original Broadcast: 6/25/08

#### Dark Matter

Turns out most of the universe is held together by a mysterious, invisible substance.

[www.pbs.org/nova/sciencenow/0301/01.html](http://www.pbs.org/nova/sciencenow/0301/01.html)

Run time: 13:50

Subject area: Physics & Space Science

More info: *Host Neil deGrasse Tyson reports from a half mile underground in an abandoned mine, where scientists are using special detectors to look for evidence of a ghostly substance that they believe makes up most of the matter of the universe—a hypothetical entity called dark matter. Dark matter has yet to be seen, but theorists have good reason to believe that it exists and that galaxies, stars, and planets would never have formed without the gravitational attraction it exerts on ordinary matter. In fact, this is how they know that dark matter must be out there—from the otherwise inexplicable effects that this unseen stuff has on galaxies and galaxy clusters.*

#### Of Mice and Memory

Mice placed in enriched environments can recover lost memories, giving hope to those who study Alzheimer's.

[www.pbs.org/nova/sciencenow/0301/02.html](http://www.pbs.org/nova/sciencenow/0301/02.html)

Run time: 12:16

Subject area: Health & Biosciences

More info: *NOVA scienceNOW reports on recent work that shows that mice—and maybe humans—could have previously unsuspected resources of memory. Researchers have found that mice with induced memory loss are able to retrieve memories either by being put into an enriched environment or by being given a drug that promotes gene activity in their brains that is important in memory. While scientists continue working on extending this work to humans, it's striking that many Alzheimer's sufferers temporarily improve in an activity-rich environment, providing a tantalizing clue to further research on the possible mechanisms at work in the brain.*

#### Profile: Hany Farid

This self-proclaimed "accidental scientist" is a digital detective inventing new ways to tell if photos have been faked.

[www.pbs.org/nova/sciencenow/0301/03.html](http://www.pbs.org/nova/sciencenow/0301/03.html)

Run time: 13:12

Subject area: Technology & Math; Scientist Profiles

More info: *Is seeing believing? In this age of easy photo manipulation, sometimes you have to call in a digital detective to be sure. Enter Hany Farid, professor of computer science at Dartmouth College. Farid got the idea for software that detects doctored photos from a celebrity shot that showed Angelina Jolie and Brad Pitt strolling on the beach early in their relationship. On closer inspection, Farid realized the light hit the two figures from different angles, so "Brangelina" couldn't have been together. He went on to develop a program that can unmask photo tampering by analyzing light sources and other subtle features in an image—a service that turns out to be in high demand.*

#### Wisdom of the Crowd

Ask enough people to estimate something, and their combined guesses will get you surprisingly close to the right answer.

[www.pbs.org/nova/sciencenow/0301/04.html](http://www.pbs.org/nova/sciencenow/0301/04.html)

Run time: 4:28

Subject area: Technology & Math

More info: *Beware of fallacies in statistical reasoning! That's the moral of this comical, originally composed song about the famed British scientist Sir Francis Galton, who lived from 1822 to 1911. A proud aristocrat, he thought he was proving the ignorance of the masses in his observation about a country-fair competition in which entrants were asked to guess the exact weight of an ox. The correct answer was 1,198 pounds, and none of the 800 contestants got it exactly. However, Sir Francis failed to realize that graphing all the guesses and determining their median produces the right answer, and shows the "wisdom of the crowd."*

## Season 2, Episode 5

### Original Broadcast: 6/24/07

#### T. Rex Blood?

Preserved soft tissue, including possible blood vessels and red blood cells, are turning up in dinosaur fossils.

[www.pbs.org/nova/sciencenow/3411/01.html](http://www.pbs.org/nova/sciencenow/3411/01.html)

Run time: 12:58

Subject area: Natural & Human Worlds

More info: *All we know about dinosaurs comes from fossils. Thanks to paleobiologist Mary Schweitzer these old bones are telling us more than ever. Schweitzer defied the long-held belief that it was fruitless to search for preserved soft tissues in dinosaur remains. Most experts held that such structures should have decayed away long ago, but Schweitzer has found evidence of delicate structures such as blood vessels and red blood cells that miraculously survived for millions of years. Recently she examined one cross section of 68-million-year-old bone and confidently announced: What we have here is a pregnant Tyrannosaurus rex!*

#### Epigenetics

Our lifestyles and environment can change the way our genes are expressed, leading even identical twins to become distinct as they age.

[www.pbs.org/nova/sciencenow/3411/02.html](http://www.pbs.org/nova/sciencenow/3411/02.html)

Run time: 13:02

Subject area: Health & Biosciences

More info: *Once nurture seemed clearly distinct from nature. Now it appears that our diets and lifestyles literally change the expression of our genes. How? By influencing a vast network of chemical switches inside our cells. Called collectively the epigenome, the switches turn genes on and off and may account for the fact that identical twins grow less identical as they age. This new understanding may give us potent new medical therapies and even cures, because many diseases now appear to stem from errors in the epigenome, and such epigenetic errors seem easier to correct than genetic ones.*

#### Kryptos

A coded sculpture at CIA headquarters has yet to be fully broken.

[www.pbs.org/nova/sciencenow/3411/03.html](http://www.pbs.org/nova/sciencenow/3411/03.html)

Run time: 11:52

Subject area: Technology & Math

More info: *Get out your pencils: the most mysterious of all codes in the most clandestine of all places has yet to be fully broken. "Kryptos," a coded sculpture in the courtyard of CIA headquarters in Langley, Virginia, contains a long string of seemingly nonsensical letters that conceal a message devised by sculptor James Sanborn. The deciphered sections include a poem, a reference to something buried on CIA grounds, and an extract from an eyewitness report of the discovery of King Tut's tomb. But the beguiling last bit of the message remains a mystery. Solutions anyone?*

#### Profile: Arlie Petters

A boy from a rural village in Belize grows up to become a world-class mathematician and cosmologist.

[www.pbs.org/nova/sciencenow/3411/04.html](http://www.pbs.org/nova/sciencenow/3411/04.html)

Run time: 8:27

Subject area: Technology & Math; Scientist Profiles

More info: *Petters' long journey from the shores of the Caribbean to the cutting edge of mathematical physics took him from Belize to a rough neighborhood in Brooklyn, where he immigrated as a teenager. Petters excelled in high school and then attended Hunter College, where he attracted the attention of the head of a scholarship program for minorities interested in science. A doctorate at the Massachusetts Institute of Technology followed. Throughout his amazing career, Petters has always continued to help and inspire those back home in Belize.*

## Season 2, Episode 4

### Original Broadcast: 7/10/07

#### Sleep

Why do we need sleep? Part of the answer may be to strengthen memories.

[www.pbs.org/nova/sciencenow/3410/01.html](http://www.pbs.org/nova/sciencenow/3410/01.html)

Run time: 12:52

Subject area: Health & Biosciences

*More info: We spend about one-third of our lives sleeping. Why? Believe it or not, scientists don't know for sure. But evidence is building that sleep may play a crucial role in strengthening memories and facilitating learning, not just in humans but in most animals. NOVA scienceNOW visits research labs where scientists are peering into the brains of dozing flies and rats to understand the connection between sleep and memory. And at Harvard Medical School, host Neil DeGrasse Tyson tests his powers of learning on a virtual ski machine and a speed typing exercise, and then catches some z's. He discovers that it's not practice that makes perfect, but practice plus a night of sleep!*

#### CERN

Beneath the Alps, the mother of all particle accelerators nears completion.

[www.pbs.org/nova/sciencenow/3410/02.html](http://www.pbs.org/nova/sciencenow/3410/02.html)

Run time: 12:25

Subject area: Physics & Space Science; Technology & Math

*More info: Get ready for the mother of all particle accelerators: the Large Hadron Collider (LHC) now nearing completion at CERN, the international particle physics lab headquartered in Geneva, Switzerland. NOVA scienceNOW reports on the ambitious goals of this 16-mile-long circular racetrack, which is designed to smash protons together at near-light speed. The subatomic debris left over from these breakneck collisions may include the as yet undetected Higgs particle. This conjectured force carrier may account for the mass of all elementary particles.*

#### Emergence

How does the "intelligence" of an ant colony or the stock market arise out of the simple actions of its members?

[www.pbs.org/nova/sciencenow/3410/03.html](http://www.pbs.org/nova/sciencenow/3410/03.html)

Run time: 11:54

Subject area: Natural & Human Worlds

*More info: A general commands an army, a conductor conducts an orchestra, chickens have their "pecking order"—by all appearances order is imposed from the top down. But scientists have found that order can also spring from the bottom up in a phenomenon called emergence. The seemingly coordinated movement of a school of fish or a flock of birds is not controlled by any leader; instead, it "emerges" naturally as each individual follows a few instinctual rules such as: go in the same direction as the other guy, don't get too close, and flee any predators. Emergence explains how crowds of humans pass each other smoothly in a crosswalk, and it may eventually explain such baffling questions as the cause of consciousness and the origin of life itself.*

#### Profile: Julie Schablitsky

Meet an archeologist who is helping to rewrite the history of the Old West.

[www.pbs.org/nova/sciencenow/3410/04.html](http://www.pbs.org/nova/sciencenow/3410/04.html)

Run time: 9:22

Subject area: Natural & Human Worlds; Scientist Profiles

*More info: Julie Schablitsky is rewriting the history of the Old West. Last year the University of Oregon archeologist presented evidence that some members of the Donner family did everything but resort to cannibalism during their ill-fated California trek. Schablitsky is also shedding new light on one of the most poorly documented aspects of life on the frontier: the history of the thousands of Chinese laborers who built our railroads and did other backbreaking work. Written records connected with Chinese immigrants are scarce, but their history can be read from the objects Schablitsky is turning up. In other innovative research, she is one of the first archeologists to recover historic-period human DNA from an artifact—in this case a medical syringe that reveals clues about its several users.*

## Season 2, Episode 3

### Original Broadcast: January, 2007

#### Aging

Will research into "longevity genes" help us live longer and healthier lives?

[www.pbs.org/nova/sciencenow/3401/01.html](http://www.pbs.org/nova/sciencenow/3401/01.html)

Run time: 12:36

Subject area: Health & Biosciences

More info: *Meet a remarkable group of centenarians, who reveal they have not exactly been following doctor's orders—claiming instead dubious diets of french fries, roast beef, and Scotch. Family histories of longevity have led scientists to look for what protects these individuals from the environment and their own excesses, while other researchers are tapping into animal and human genetic codes for insight into the processes that cause aging, with some startling results. Can they use this information to create a life-prolonging elixir for the rest of us? In a piece full of riveting hard science and whimsical human stories, NOVA scienceNOW heads to the labs for the latest findings on longevity genes and age-defying factors that could extend the human lifespan.*

#### Space Elevator

Can we build a 22,000-mile-high cable to transport cargo and people into space?

[www.pbs.org/nova/sciencenow/3401/02.html](http://www.pbs.org/nova/sciencenow/3401/02.html)

Run time: 11:43

Subject area: Physics & Space Science; Technology & Math

More info: *Going up . . . next stop, outer space! What if traveling 22,000 miles into orbit were just an elevator ride away? Host Neil deGrasse Tyson investigates the viability of this intriguing new route that could one day be safer and cheaper than rockets. In this lively story, viewers meet an imaginative group of garage inventors, students, and engineers who are battling it out in a NASA-funded competition to see who can develop the best space elevator prototype and claim the \$150,000 prize.*

#### Maya

NASA archeologists use satellites to pinpoint ancient ruins buried deep in the jungle.

[www.pbs.org/nova/sciencenow/3401/03.html](http://www.pbs.org/nova/sciencenow/3401/03.html)

Run time: 13:37

Subject area: Natural & Human Worlds; Technology & Math

More info: *Space-age technology is also revolutionizing archeology. It turns out that there are secrets about our ancient past hidden down on Earth that are best revealed from space. NOVA scienceNOW heads to Guatemala with renowned archeologist William Saturno, who recounts the tale of his expedition into the jungle that nearly claimed his life, and the stunning discovery that transformed it instead. Saturno teams up with NASA archeologist Tom Sever to make use of the space agency's satellite remote-sensing technology. Together, they uncover some of the hidden treasures of ancient cultures—a collaboration that has resulted in an amazingly accurate method for peeling away layers of the rain forest to provide virtual road maps to Maya ruins buried for over 1,000 years. It's a tool that provides clues to help solve one of archeology's most enduring mysteries: the sudden collapse of Lowland Maya civilization.*

#### Profile: Bonnie Bassler

Her insight into how bacteria "talk" has launched a revolution in biological and medical research.

[www.pbs.org/nova/sciencenow/3401/04.html](http://www.pbs.org/nova/sciencenow/3401/04.html)

Run time: 9:24

Subject area: Health & Biosciences; Scientist Profiles

More info: *Meet "The Bacteria Whisperer." Introducing Princeton molecular biology professor, MacArthur fellow, and aerobics instructor Bonnie Bassler, a leading researcher in the study of quorum sensing, or the way bacteria communicate. That's right, bacteria talk to one another. They also prefer not to act alone, but in communities, the way people do. Bassler has discovered a language that practically all bacteria use to communicate—even demonstrating bacteria's ability to be bilingual. Initially shrugged off as a crazy notion, quorum sensing is now a key idea that is helping shape a path to new drugs.*

## Season 2, Episode 2

### Original Broadcast: November, 2006

#### Mass Extinction

What caused the mother of all extinctions 250 million years ago?

[www.pbs.org/nova/sciencenow/3318/01.html](http://www.pbs.org/nova/sciencenow/3318/01.html)

Run time: 13:16

Subject area: Natural & Human Worlds

More info: *Long before the dinosaurs, something triggered Earth's most profound mass extinction and reset the nature of life on this planet. Can scientists find the culprit—and does it pose a threat to our future? At a remote crime scene in the Nevada desert geologists and paleontologists are probing the rocks for signs of the perpetrator. Meanwhile, in another part of the US, a marine geochemist thinks he has found the answer in deadly bacteria that thrive in the deep lakes of New York State in conditions similar to those of ancient oceans. NOVA scienceNOW explores the possibility that these bacteria could have set off a chemical chain reaction that poisoned the seas and atmosphere. A fascinating whodunit, the story also offers a disturbing cautionary tale for modern-day global warming.*

#### 1918 Flu

A virus that killed up to 50 million people is brought back to life to decipher its deadlines.

[www.pbs.org/nova/sciencenow/3318/02.html](http://www.pbs.org/nova/sciencenow/3318/02.html)

Run time: 12:52

Subject area: Health & Biosciences

More info: *The 1918 flu virus was perhaps the deadliest pathogen in human history, responsible for 50 million deaths worldwide. Will resurrecting the virus help prevent the next great pandemic? Somewhere buried within the 1918 flu's genetic code are instructions that gave it its special ability to infect and kill its victims in a matter of hours. Visit the lab of a young CDC researcher, one of the only people in the world with clearance to work on a live 1918 flu virus in order to better understand its virulence. Using animation to illustrate the genetics of the flu virus and how it spreads, this piece reveals how a lethal virus from the past may offer a new strategy to combat another in the future.*

#### Papyrus

Scraps of writings from a garbage dump in ancient Egypt reveal what life was like 2,000 years ago.

[www.pbs.org/nova/sciencenow/3318/04.html](http://www.pbs.org/nova/sciencenow/3318/04.html)

Run time: 9:01

Subject area: Natural & Human Worlds

More info: *Excavated from an ancient city in Greek-ruled Egypt, a half-million fragile, 2,000-year-old papyri fragments now sit packed away in a vault at Oxford University. Scholars have no idea what will come out of the box: perhaps an early passage of Christian text from the Bible; a page from Homer; or revealing documentation of everyday life. But, to the frustration of expert scholars and archaeologists, many of the texts are charred, faded, or stained beyond legibility. Could a pioneering multispectral imaging technology, originally developed in NASA's Jet Propulsion Lab be the kind of "X-ray vision" archaeologists need to solve these age-old puzzles?*

#### Profile: Cynthia Breazeal

A daring engineer designs robots to communicate and interact the way people do.

[www.pbs.org/nova/sciencenow/3318/03.html](http://www.pbs.org/nova/sciencenow/3318/03.html)

Run time: 12:37

Subject area: Technology & Math; Scientist Profiles

More info: *"Robots have been in the deepest oceans, to Mars, to all of these places, but they're just now starting to come to your living room. Your living room is the final frontier for robots," claims young roboticist Cynthia Breazeal in an engaging profile that showcases her innovative creations. Captivated at age 10 by the original Star Wars movie, Breazeal is now a professor at the MIT Media Laboratory, and a pioneer in the development of "sociable robots"—machines that are not just smart but that can communicate just as people do. And if, as Breazeal hopes, robots are to become our partners, they need to develop the same social skills as people—including emotions.*

## Season 2, Episode 1

### Original Broadcast: October, 2006

#### Asteroid

Will a doomsday rock the size of the Rose Bowl hit Earth in 2036?

[www.pbs.org/nova/sciencenow/3313/01.html](http://www.pbs.org/nova/sciencenow/3313/01.html)

Run time: 12:00

Subject area: Physics & Space Science; Natural & Human Worlds

More info: *Seen through our most powerful telescopes, the Apophis asteroid shows up as nothing more than a moving speck of light. However, the latest data tells us that this rock is bigger than the Rose Bowl, could carry an impact equal to one hundred nuclear bombs, and is hurtling through interplanetary space towards the Earth. We've seen the Hollywood films inspired by such threats. The truth is, Earth has been hit by asteroids before and it will get hit again. It is up to NASA's asteroid hunters to scan the heavens constantly to find these monster chunks of space debris, estimate the odds of collision and figure out a way to avoid it. Find out just what kind of threat asteroids pose, and what creative interventions might be used to prevent a devastating collision.*

#### Island of Stability

Follow the decades-long quest to create the elusive element 114.

[www.pbs.org/nova/sciencenow/3313/02.html](http://www.pbs.org/nova/sciencenow/3313/02.html)

Run time: 13:00

Subject area: Physics & Space Science; Technology & Math

More info: *Original animation illuminates the decades long search by nuclear chemists to reach the shores of the magical "Island of Stability," a theory on the creation of new elements for the Periodic Table. While most elements were born within stars, scientists are struggling to create new ones in the lab that will remain stable. If scientists can just get to a "magic" number of protons and neutrons, the theory purports, the resulting new element will be remarkably stable, lasting not milliseconds, but perhaps years.*

#### Obesity

Examine the biology behind the compulsion to eat.

[www.pbs.org/nova/sciencenow/3313/03.html](http://www.pbs.org/nova/sciencenow/3313/03.html)

Run time: 12:00

Subject area: Health & Biosciences

More info: *As Americans grapple with their ever-increasing waistlines, science is looking at the biology behind the compulsion to eat. Researchers have discovered a chemical in your brain proven to regulate body weight—a fact that has brought scientists closer to understanding the mechanism that controls appetite. NOVA scienceNOW interviews patients like Teresa Godfrey, who has battled obesity all her life, suspecting that her relationship with food has been hardwired. Due to these scientific advances, she now knows her appetite is genetically determined, which alleviates some of the psychological pain caused by the erroneous notion that her obesity is purely a matter of a lack of willpower. But can pinpointing a "fat gene" signal the road to a remedy? As Godfrey awaits a cure, she knows the answer is less about losing weight than gaining self-acceptance.*

#### Profile: Karl Iagnemma

An innovative MIT roboticist is also an acclaimed fiction writer.

[www.pbs.org/nova/sciencenow/3313/04.html](http://www.pbs.org/nova/sciencenow/3313/04.html)

Run time: 10:00

Subject area: Technology & Math; Scientist Profiles

More info: *Recognized as one of the top ten innovative scientists in America, Karl Iagnemma gives new meaning to the notion of the bookish scientist. In addition to working with a team of MIT researchers who are designing robots for NASA, he is also a breakout fiction writer. His short story collection has been optioned by Brad Pitt for possible feature film development, and his new novel is already generating high interest. Smashing the stereotype of the brainy, bespectacled researcher toiling away in a laboratory, this segment illustrates how science and creativity are linked and how imagination is the key to innovation in any discipline.*

## Season 1, Episodes 1-5

### Original Broadcasts: January, 2005 – January, 2006

#### 10th Planet

A stunning discovery at the far reaches of our solar system raises questions about what makes a planet a planet.

[www.pbs.org/nova/sciencenow/3302/01.html](http://www.pbs.org/nova/sciencenow/3302/01.html)

Run time: 5:00

Subject area: Physics & Space Science

More info: *Original broadcast January 2006, Season 1, Episode 5*

#### Twin Prime Conjecture

New insight into a 2,300-year-old mystery surrounding prime numbers inspires a song.

[www.pbs.org/nova/sciencenow/3302/02.html](http://www.pbs.org/nova/sciencenow/3302/02.html)

Run time: 3:00

Subject area: Technology & Math

More info: *Original broadcast January 2006, Season 1, Episode 5*

#### Ivory-Billed Woodpecker

An enchanting bird believed extinct mysteriously reappears ... maybe.

[www.pbs.org/nova/sciencenow/3302/03.html](http://www.pbs.org/nova/sciencenow/3302/03.html)

Run time: 7:00

Subject area: Natural & Human Worlds

More info: *Original broadcast January 2006, Season 1, Episode 5*

#### Pandemic Flu

Will the virus that causes bird flu develop the ability to move from person to person?

[www.pbs.org/nova/sciencenow/3302/04.html](http://www.pbs.org/nova/sciencenow/3302/04.html)

Run time: 6:00

Subject area: Health & Biosciences

More info: *Original broadcast January 2006, Season 1, Episode 5*

#### Lab Meat?

Scientists can grow edible meat in the laboratory from a few animal cells. Bon appétit?

[www.pbs.org/nova/sciencenow/3302/05.html](http://www.pbs.org/nova/sciencenow/3302/05.html)

Run time: 2:00

Subject area: Health & Biosciences; Technology & Math

More info: *Original broadcast January 2006, Season 1, Episode 5*

#### Stem Cells Update

A new technique for creating stem cells may ease ethical concerns.

[www.pbs.org/nova/sciencenow/3302/06.html](http://www.pbs.org/nova/sciencenow/3302/06.html)

Run time: 8:00

Subject area: Health & Biosciences; Technology & Math

More info: *Original broadcast January 2006, Season 1, Episode 5*

**Stronger Hurricanes**

Is global warming making hurricanes more intense?

[www.pbs.org/nova/sciencenow/3302/07.html](http://www.pbs.org/nova/sciencenow/3302/07.html)

Run time: 6:00

Subject area: Natural & Human Worlds

More info: *Original broadcast January 2006, Season 1, Episode 5*

**Profile: Tyler Curiel**

In the midst of Hurricane Katrina, a cancer researcher risks everything to save a medical treasure.

[www.pbs.org/nova/sciencenow/3302/08.html](http://www.pbs.org/nova/sciencenow/3302/08.html)

Run time: 10:00

Subject area: Health & Biosciences; Scientist Profiles

More info: *Original broadcast January 2006, Season 1, Episode 5*

**Artificial Life**

Are scientists on the verge of making living things from little more than dust?

[www.pbs.org/nova/sciencenow/3214/01.html](http://www.pbs.org/nova/sciencenow/3214/01.html)

Run time: 15:00

Subject area: Health & Biosciences

More info: *Original broadcast October 2005, Season 1, Episode 4*

**Lightning**

Experts still aren't sure what triggers it, but they suspect cosmic rays from outer space.

[www.pbs.org/nova/sciencenow/3214/02.html](http://www.pbs.org/nova/sciencenow/3214/02.html)

Run time: 9:00

Subject area: Physics & Space Science; Natural & Human Worlds

More info: *Original broadcast October 2005, Season 1, Episode 4*

**Profile: Erich Jarvis**

The work of neuroscientist Erich Jarvis demonstrates the power of open-mindedness in the lab.

[www.pbs.org/nova/sciencenow/3214/03.html](http://www.pbs.org/nova/sciencenow/3214/03.html)

Run time: 12:00

Subject area: Health & Biosciences; Scientist Profiles

More info: *Original broadcast October 2005, Season 1, Episode 4*

**Fish Surgery**

Veterinary medicine has caught up with Americans' love for their number one choice of pet, the fish.

[www.pbs.org/nova/sciencenow/3214/04.html](http://www.pbs.org/nova/sciencenow/3214/04.html)

Run time: 6:00

Subject area: Health & Biosciences

More info: *Original broadcast October 2005, Season 1, Episode 4*

**Don't Ask the Expert: Neil deGrasse Tyson**

Neil deGrasse Tyson has a bone to pick with Hollywood aliens.

[www.pbs.org/nova/sciencenow/3214/05.html](http://www.pbs.org/nova/sciencenow/3214/05.html)

Run time: 2:00

Subject area: Physics & Space Science

More info: *Original broadcast October 2005, Season 1, Episode 4*

**Fuel Cells**

Hydrogen fuel cell cars promise pollution-free driving, but will we see them anytime soon?

[www.pbs.org/nova/sciencenow/3210/01.html](http://www.pbs.org/nova/sciencenow/3210/01.html)

Run time: 14:00

Subject area: Technology & Math

More info: *Original broadcast July 2005, Season 1, Episode 3*

**RNAi**

A wayward petunia leads to a discovery of modest molecules with enormous medical promise.

[www.pbs.org/nova/sciencenow/3210/02.html](http://www.pbs.org/nova/sciencenow/3210/02.html)

Run time: 15:00

Subject area: Health & Biosciences

More info: *Original broadcast July 2005, Season 1, Episode 3*

**Fastest Glacier**

A glacier moving way too fast reveals how unpredictable the effects of global warming can be.

[www.pbs.org/nova/sciencenow/3210/03.html](http://www.pbs.org/nova/sciencenow/3210/03.html)

Run time: 7:00

Subject area: Natural & Human Worlds

More info: *Original broadcast July 2005, Season 1, Episode 3*

**Profile: Brothers Chudnovsky**

The story of two brilliant mathematicians, a unicorn, and a homemade supercomputer.

[www.pbs.org/nova/sciencenow/3210/04.html](http://www.pbs.org/nova/sciencenow/3210/04.html)

Run time: 10:00

Subject area: Technology & Math; Scientist Profiles

More info: *Original broadcast July 2005, Season 1, Episode 3*

**Little People of Flores**

The remains of three-foot-tall humans are discovered on a remote Indonesian island.

[www.pbs.org/nova/sciencenow/3209/01.html](http://www.pbs.org/nova/sciencenow/3209/01.html)

Run time: 12:00

Subject area: Natural & Human Worlds

More info: *Original broadcast April 2005, Season 1, Episode 2*

**T. Rex**

An astonishing adolescent growth spurt accounts for T. rex's enormous size.

[www.pbs.org/nova/sciencenow/3209/02.html](http://www.pbs.org/nova/sciencenow/3209/02.html)

Run time: 8:00

Subject area: Natural & Human Worlds

More info: *Original broadcast April 2005, Season 1, Episode 2*

**Profile: Naomi Halas**

Meet a pioneering nanotechnologist bent on seeing practical applications for her work—soon.

[www.pbs.org/nova/sciencenow/3209/03.html](http://www.pbs.org/nova/sciencenow/3209/03.html)

Run time: 15:00

Subject area: Health & Biosciences; Scientist Profiles

More info: *Original broadcast April 2005, Season 1, Episode 2*

**Stem Cells**

What are they, and how do we find a balance between hope for cures and respect for life?

[www.pbs.org/nova/sciencenow/3209/04.html](http://www.pbs.org/nova/sciencenow/3209/04.html)

Run time: 4:00

Subject area: Health & Biosciences; Technology & Math

More info: *Original broadcast April 2005, Season 1, Episode 2*

**Frozen Frogs**

The common wood frog freezes solid every winter and then, come spring, defrosts and mates.

[www.pbs.org/nova/sciencenow/3209/05.html](http://www.pbs.org/nova/sciencenow/3209/05.html)

Run time: 14:00

Subject area: Natural & Human Worlds

More info: *Original broadcast April 2005, Season 1, Episode 2*

**Mirror Neurons**

A recently discovered system in the brain may help explain why we humans can get so worked up watching other people.

[www.pbs.org/nova/sciencenow/3204/01.html](http://www.pbs.org/nova/sciencenow/3204/01.html)

Run time: 12:00

Subject area: Health & Biosciences

More info: *Original broadcast January 2005, Season 1, Episode 1*

**Hurricanes**

Predicting a hurricane's intensity is notoriously difficult, but new tools may make it easier.

[www.pbs.org/nova/sciencenow/3204/02.html](http://www.pbs.org/nova/sciencenow/3204/02.html)

Run time: 12:00

Subject area: Physics & Space Science; Natural & Human Worlds

More info: *Original broadcast January 2005, Season 1, Episode 1*

**Profile: James McLurkin**

James McLurkin of MIT is one of the world's leading designers of robot "swarms"—groups of robots that work together for a greater purpose.

[www.pbs.org/nova/sciencenow/3204/03.html](http://www.pbs.org/nova/sciencenow/3204/03.html)

Run time: 10:00

Subject area: Technology & Math; Scientist Profiles

More info: *Original broadcast January 2005, Season 1, Episode 1*

**Booming Sands**

Scientists look into a generations-old conundrum: how and why do certain sand dunes produce mysterious noises?

[www.pbs.org/nova/sciencenow/3204/04.html](http://www.pbs.org/nova/sciencenow/3204/04.html)

Run time: 7:00

Subject area: Physics & Space Science; Natural & Human Worlds

More info: *Original broadcast January 2005, Season 1, Episode 1*