

# The illuminated body

Scientists discover that the human body emits light

By LEONARDO VINTIÑI  
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When we think of glowing organisms, only a few examples come to mind. The more well-known examples of bioluminescent creatures include fireflies and the fluorescent jellyfish, but recently scientists have discovered that the human body emits light as well.

Through a joint effort among scientists at Tohoku Institute of Technology and Kyoto University in Japan, researchers have discovered that humans are actually bioluminescent organisms ... to a point.

Naturally, the light that humans emit is not very bright. In fact, the glow that our bodies give off is a thousand times less than what our eyes can detect. However, scientists have discovered that this dim fluorescence can be captured by ultrasensitive equipment known as a cryogenic charge-coupled-device (CCD) camera.

## TAKING THE PICTURE

In order to capture this faint light emanating from a human body, scientists had to first cool down the CCD to 184 degrees F and photograph a subject in complete darkness. This light was found to measure on the level of a single photon.

In a darkroom, five males aged around 20, stood naked above the waist in front of the camera and were imaged for 20 minutes every three hours from 10 a.m. to 10 p.m.

The researchers were able to detect light emission from these subjects with a wavelength of 500–700 nm, recognizable for human eyes in the color spectrum as the colors green and red.

Any glow, however faint, makes for an interesting feature in an organism. Yet humans may not



HEALTHY GLOW: Japanese scientists have discovered that the human body actually emits light. PHOTOS.COM

be as special in this regard. Researchers explained that this bioluminescence is present in virtually all living organisms.

However, another study done at the International Institute of Biophysics in Germany found that light emanation increased in meditating subjects. Observing biochemical shifts following a period of meditation, researchers found that the practice actually increased human photon emission.

## BRIGHT FACES

This ultraweak light emission has no significant correlation to temperature. Instead, it is more connected to a series of complicated chemical energy reactions in the metabolic process, which transfer energy to fluorophores—molecular components responsible for fluorescence.

Depending on the number of fluorophores and their environment, fluorescence differs in intensity and wavelength. That's

why researchers observed a stronger emission from the face than the body. When it comes to overall sunlight exposure, faces get the most, and a greater number of fluorophores is found on the face than on the skin of the rest of the body.

Researchers also found that these light emissions fluctuate throughout the day, with the weakest glow occurring at 10 a.m. and the strongest at 4 p.m. They believe that this is possibly related to the human body's circadian rhythm—our biochemical internal clock responsible for regulating a host of physiological processes throughout the body.

According to researcher Hitoshi Okamura, a circadian biologist at Kyoto University, this finding suggests that light emission could help spot certain medical conditions.

To read the Japanese scientists' research paper, please visit <http://tinyurl.com/y8ge82f>

# Graphic design with CorelDRAW Graphics Suite X4

A hands-on review of Corel's software suite for drawing, page layout, and overall design

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Although it is often overshadowed by Adobe's software suites, CorelDRAW Graphics Suite X4 has some great features and an easy-to-use workspace that make it a strong contender in the design software market.

You could compare CorelDRAW to Adobe's Illustrator and InDesign, as it does both vector graphics and page layout, just as you could compare CorelPhoto-Paint to Adobe Photoshop, yet such comparisons would not be completely accurate or fair, as there are many differences between these programs.

However, it's the sheer simplicity of CorelDRAW Graphics Suite X4 that has won it a rather dedicated following, and with good reason—it really feels like the software is working with you. This aspect of the program will certainly appeal to inexperienced users, as it should not take long to learn the software suite, but even professional users are sure to enjoy the friendly environment the suite has to offer.

## KEEPING IT SIMPLE

CorelDRAW Graphics Suite X4 really has a lot to offer, and it comes with just about every tutorial and reference material a user could want.

The software includes CorelDRAW X4, a vector drawing and page layout tool; Corel PHOTO-PAINT X4, for image editing; and several other minor tools.

It also includes more than 1,000 fonts, 10,000 clip art images, 1,000 high resolution photos, and 80 templates. These are great to have on hand, and cover most of the basic needs of professional designers.

The program also comes with a handy reference book that contains images and reference numbers for all the fonts, images, and templates. The idea behind this is that you could, for example, offer it to a client so they could choose which graphics they might want to include in a Web site.

The package also has a more than 450-page user manual complete with walkthroughs of the suite's different tools, a keyboard shortcut reference sheet, tutorial videos, and a small handbook with tips and tricks from professional designers around the world.

Through Corel's Web site you also have access to a whole library of tutorials, videos, and other ma-

terials, as well as the Corel online community.

Most importantly, the software is simple and easy to use. The tools are rather straight forward and if you can't figure them out, the live "Hints" tab tells you what it does, or you can consult the other tutorials available.

## STREAMLINING THE WORKFLOW

Aside from its main functions in vector drawing, page layout, and image editing—all of which work very well—the software also has some unique perks.

One of them is Corel ConceptShare which is a brilliant edition to the package. This allows you to upload a project to the Web where multiple people can then review it and make notes in real time.

Let's say, for instance, you were designing a brochure for a restaurant in another city. You can upload your project to ConceptShare, and the client can view it on the ConceptShare Web site and assess your work. They can then make notes on what they like and what needs revision, and you can continue the project making the necessary changes without an in-person meeting.

Although there are paid subscription plans, there is also a free plan offering three workspaces so that you can have more than one project going at a time.

Another tool offered by CorelDRAW Graphics Suite X4 is integration with the WhatTheFont Web site. A screen capture tool lets you take an image of any font, which can then be identified through the Web site.

This comes in handy if, for example, you wanted to use the same font you found on a Web site, or if a client wants a specific font from a brochure they like.

## IN A FEW WORDS

Although Corel's design software suite doesn't include all the features you would find in Adobe's design suite, the user-friendly environment Corel offers makes this a worthy contender. The software also has a reasonable price of \$429, which is less than what you would pay for just a single aspect of Adobe's design suite, such as Illustrator CS4 which goes for \$599.

Some graphic designers swear by CorelDRAW Graphics Suite X4, while others stick strongly to Adobe's software. Some users, like myself, prefer to have both. In the end, it really comes down to a matter of personal preference and what you plan to do with the software.

CorelDRAW Graphics Suite X4's focus is on streamlining workflow and making the process as smooth and simple as possible. It does this wonderfully.

## SCORE CARD:

EFFECTIVENESS: B+  
INTERFACE: A  
USABILITY: A+  
INSTALLATION: A  
OVERALL: A

PRICE: \$429  
WEBSITE: WWW.COREL.COM



DESIGN PACKAGE: A box shot of CorelDRAW Graphics Suite X4 and three reference and tutorial books that are included with the software. JOSHUA PHILIPP/ THE EPOCH TIMES

## SCIENCE MATTERS

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### Life altering planetary experience

By David Suzuki with Faisal Moola

Insurance companies, politicians, and businesspeople often use the expressions "natural disaster" or "act of God" to deflect responsibility for events beyond our control. Today, human activity and technology have become so powerful that we are contributing to what were once natural disasters.

Hurricanes, tornadoes, freak storms, floods, droughts, pest outbreaks, heat waves, and even earthquakes are occurring with greater frequency and intensity than ever. Some of this can be traced to human activity. Greenhouse gases, immense dams, and deep oil and water wells can all affect natural forces.

Since life first appeared on Earth some four billion years ago, it has played a critical role in altering the physical and chemical properties of the planet. For the first couple of billion years, it was a microbial world, yet those microscopic organisms acted with other forces to break down rock. Over time, this process reduced mountains and boulders to stones, gravel, and dust, releasing minerals and creating soils from the carcasses of organisms.

Life is thought to have evolved in oceans. Here, carbon from the atmosphere dissolved in the water to form carbonaceous shells that offered protection for some life forms. When these died, they sank to the ocean floor where eventually their accumulated shells were pressurized into limestone. Limestone is rock, created by life, which stores carbon in the ground.

As life forms evolved, they grew bigger, in part by incorporating and storing water. In doing so, they became a critical part of the hydrologic cycle, the process whereby water evaporates, forms clouds, and rains back on the Earth in an endless cycle. Organisms could take up dissolved minerals and trace chemicals from the water and release them with their own wastes. After plants evolved into trees on land, they became efficient at sucking water from soil and transpiring most of it into the air to affect weather and climate.

The evolution of photosynthesis was a huge biological breakthrough, enabling Earth's life to capture vast amounts of energy in the form of sunlight. During photosynthesis, plants release oxygen. Over millions of years, this process reduced the amount

of carbon dioxide in the atmosphere while creating oxygen-rich air that animals like us depend on.

So for billions of years, the web of life has played a crucial role in changing the physical, chemical, and biological features of the planet. Life was not just opportunistic in exploiting physical and chemical opportunities; living organisms interacted with and changed the planet's earth, water, and air, or biosphere. But it took vast periods of time and millions of diverse species. In all that time, no single species was able to rapidly alter the properties of Earth on a geological scale—until now.

Humans appeared during the last moment of evolutionary time, perhaps 150,000 years ago. For most of our brief existence, we were tribal animals who didn't even know whether other humans lived on the other side of an ocean, desert, or mountain. We only had to worry about our own territory and tribe.

Suddenly, we have become a geological force, the most prolific mammal on the planet, endowed with powerful technologies, impelled by an insatiable appetite for stuff, and supplied by a global economy. Taken together, our numbers, technology, consumption, and global economy have made us a new kind of force on the planet. For the first time, we must ask, "What is the collective impact of 6.8 billion human beings?" As we begin to answer that question, we are left with the extreme difficulty of responding to global threats that our own activity has caused.

Many people harbour an understandable tendency to deny the reality of the crisis in the biosphere. After all, how can puny humans have such a massive impact on this large planet? Some also maintain a conceit that we can manage our way out of the mess, increasingly with heroic interventions of technology. But we've learned from past technologies—nuclear power, DDT, CFCs—that we don't know enough about how the world works to anticipate and minimize unexpected consequences.

The truth is that the only factor or species we can manage on Earth is us. We have no choice but to address the challenge of bringing our cities, energy needs, agriculture, fishing fleets, mines, and so on into balance with the factors that support all life. This crisis can become an opportunity if we seize it and get on with finding solutions.

# NASA finds ice on the Moon and on Mars

WASHINGTON (Reuters)—International space missions have found ice on the moon and more evidence of ice on Mars—good news for future settlements and also for scientists looking for extraterrestrial life.

Four reports published in Friday's issue of the journal Science show clear evidence of water, likely frozen, on the desert surfaces of both the Moon and Mars.

The U.S. space agency NASA said its Moon Mineralogy Mapper, or M3, found water molecules all over the moon's surface. The M3 instrument was carried there last October by the Indian Space Research Organization's Chandrayaan-1 spacecraft—India's first space mission.

"Water ice on the moon has been something of a holy grail for lunar scientists for a very long time," said Jim Green, director of the Planetary Science Division at NASA in Washington.

"When we say 'water on the moon,' we are not talking about lakes, oceans or even puddles. Water on the moon means molecules of water and hydroxyl (hydrogen and oxygen) that interact with molecules of rock and dust specifically in the top millimeters of the moon's surface," Carle Pieters of Brown University in Rhode Island said in a statement.

Jessica Sunshine of the University of Maryland and colleagues



ICE ON MARS: At NASA Headquarters in Washington, D.C., Carle Pieters (L), principal investigator, and Rob Green (R), project instrument scientist, discuss new science data from the moon collected during national and international space missions. MANDEL NGAN/AFP/GETTY IMAGES

used infrared mapping from the Deep Impact spacecraft to show water all over the moon. Roger Clark of the U.S. Geological Survey and colleagues used a spectrometer—which breaks down light waves to analyze elements and chemicals reflecting them—from the Cassini spacecraft to identify water.

## MOON WATER NOT LIKE GROUNDWATER

"This water on the moon appears to be bound up with minerals such that it is stable in the airless and low-gravity environment of the moon," Marc Norman of Australian National University in Canberra said in a statement. "So we won't be able to pump it like groundwater, but will have to collect fairly large

volumes of lunar soil, then extract and store the water for use."

In the fourth report, NASA said its Mars Reconnaissance Orbiter spotted ice at five new Martian craters, likely kicked up by meteor impacts.

"We now know we can use new impact sites as probes to look for ice in the shallow subsurface," Megan Kennedy of Malin Space Science Systems in San Diego, who worked on the study, said in a statement.

"This ice is a relic of a more humid climate from perhaps just several thousand years ago," added Shane Byrne of the University of Arizona.

"This is a real water resource," said Louis Friedman, executive director of the Planetary Society.

There is now no dispute that water exists on the surface of Mars—robot explorers have found ice. There is also evidence that water may still seep to the surface from underground, although it quickly disappears in the cold, thin atmosphere of the red planet.

Planetary scientists have also seen what could be the shores of giant rivers and seas on Mars.

"Having any water or hydroxyl in the sunlit areas of the Moon is as surprising as it is intriguing," added the planetary society's Bruce Betts. "Will such results turn out to be the tip of the iceberg, or will the moon remain a dry desert with slightly more moisture than we thought?"

Dr. David Suzuki is a scientist, broadcaster, author, and chair of the David Suzuki Foundation and Dr. Faisal Moola is the Director of Science at the David Suzuki Foundation.

Take David Suzuki's Nature Challenge and learn more at [www.davidsuzuki.org](http://www.davidsuzuki.org).