



BUCKMINSTER FULLER INSTITUTE  
BFI.ORG

# DESIGN SCIENCE NEWS

## Welcome to Vol. 9 No. 2 of Design Science News, the e-bulletin of the Buckminster Fuller Institute

Design Science News brings you news from around the world related to humanity's option for success and comprehensive design science. It also features updates from BFI and periodic special offers for our members.

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## The 2008 Design Science Lab is now accepting applications!



The Design Science Lab is a rigorous, hands-on training in the problem solving, planning and design methodology called Design Science, pioneered by Buckminster Fuller and other visionaries. Participants engage in a whole systems and anticipatory approach to develop strategies to solve global and local problems that is based on innovation and thrives on transparency.

The 2008 Design Science Lab offers participants the opportunity to focus their work to design new energy futures and devise strategies to combat climate change in a number of ways:

1. **Millennium Development Goal 7** is focused on environmental sustainability, of which energy is a key factor. Using the vast information resources of the United Nations and drawing from your own research, determine what is being done successfully, what needs attention, and what you can do about it. Design a plan to help meet this important goal.
2. **The Buckminster Fuller Challenge** is a unique award program conferring a prize of \$100,000 to an individual or team who develops a design science solution to a major problem facing humanity. Use the design science lab as a springboard for your entry to the 2008-2009 [Buckminster Fuller Challenge](#);

receive critical feedback from expert design scientists and members of the 2007-2008 Challenge selection committee and see if you have what it takes to help make the world work for 100% of humanity. Come with an idea in mind or use the Lab to develop your idea. Bring your team (see [tuition](#) page for information on team discounts) or meet other participants and form a team during the Lab.

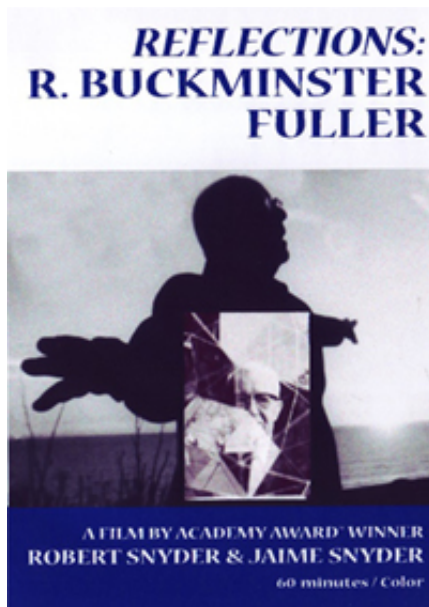
3. **PLANYC 2030** New York City has announced a citywide initiative to modernize its energy system and combat climate change called [PLANYC 2030](#). With this plan as your starting point, analyze what makes sense, what doesn't, and design alternative strategies to make New York City the greenest on earth and a model for other urban environments.
4. **Greening UNIS.** Is the United Nations International School as "green" as it could be? Using the tools of design science, research the school's buildings, practices, policies, and plans and propose alternatives to create a "greener" UNIS that sets an example for other schools in New York and around the world.

The Lab will take place for seven and a half intensive days from June 16th to June 23rd at the United Nations and United Nations International School in New York City, NY. Space is limited and qualified applicants are accepted on a first come first served basis.

To read more about the program, view the work of previous Labs, or begin your application, please visit [the Design Science Lab website](#)

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## NEW IN OUR ONLINE STORE: Reflections - R. Buckminster Fuller on DVD



Winner of the CINE Golden Eagle Award. This documentary contains footage of Bucky never seen before and never distributed in the U.S. Made for the U.S. Information Agency in 1977 by award-winning filmmaker Robert Snyder and Jaime Snyder. The film contains wonderfully intimate sequences with Fuller talking about his childhood, family and youth. One of the best films available on Bucky. Video. 60 minutes, DVD Video. [Order your copy today!](#)

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## TRENDS & PERSPECTIVES

## Car-free, solar city in Gulf could set a new standard for green design



In an ever more crowded world facing environmental limits, the push is on to create entire communities with reduced needs for energy, water, land and other resources. The latest effort comes not in some green hub like Portland, Ore., but in the Persian Gulf, fueled as much by oil wealth - and the need to find postpetroleum business models - as environmental zeal.

Groundbreaking is scheduled for Saturday for Masdar City, a nearly self-contained mini-municipality designed for up to 50,000 people rising from the desert next to Abu Dhabi's international airport and intended as a hub for academic and corporate research on nonpolluting energy technologies. The 2.3-square-mile community, set behind walls to divert hot desert winds and airport noise, will be car free, according to the design by Foster + Partners, the London firm that has become a leading practitioner of energy-saving architecture.

For additional information about the project, visit the [Foster + Partners website](http://www.fosterpartners.com/masdar).  
(Source: [The New York Times](http://www.nytimes.com/2008/02/05/science/earth/05city.html?scp=1&sq=masdar&st=nyt))

<http://www.nytimes.com/2008/02/05/science/earth/05city.html?scp=1&sq=masdar&st=nyt>

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## First look at vast “book of life”



The first 30,000 pages have been unveiled of a vast encyclopedia which aims to catalogue every one of our planet's 1.8 million species. The immense online resource is designed to greatly enhance our understanding of the world's diminishing biodiversity. The creators of the database say it could have an impact on human knowledge comparable to that which followed the microscope's invention in the 1600s. It is designed to be used by everyone from scientists to lay readers.

The Encyclopedia of Life (EOL) - described as the "ultimate field guide" - is to encompass all six kingdoms of life, and even viruses - which many researchers do not consider to be living organisms. Those behind the sprawling database say it could help scientists assess the impact of climate change on animals and plants. It may also help foster strategies for slowing the spread of invasive species and allow the spread of disease to be tracked. Visit the [Encyclopedia of Life](http://www.encyclopediaoflife.org/). (Source: [BBC News](http://news.bbc.co.uk/2/hi/science/nature/7263134.stm))

<http://news.bbc.co.uk/2/hi/science/nature/7263134.stm>

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## Trash-based biofuels: from landfill to full tank of gas





The remains of plants processed for human purposes molder in landfills across the world. Whether waste paper or raked leaves, the plant remnants still contain cellulose, a sugar in greenery that bonds with the chemical compound lignin to furnish a plant's structure. Microbes living in the landfills break down this cellulose into methane, which slowly seeps to the surface and into the atmosphere, where it is a potent greenhouse gas. BlueFire Ethanol, Inc., in Irvine, Calif., would rather harvest that energy for use as cellulosic ethanol fuel.

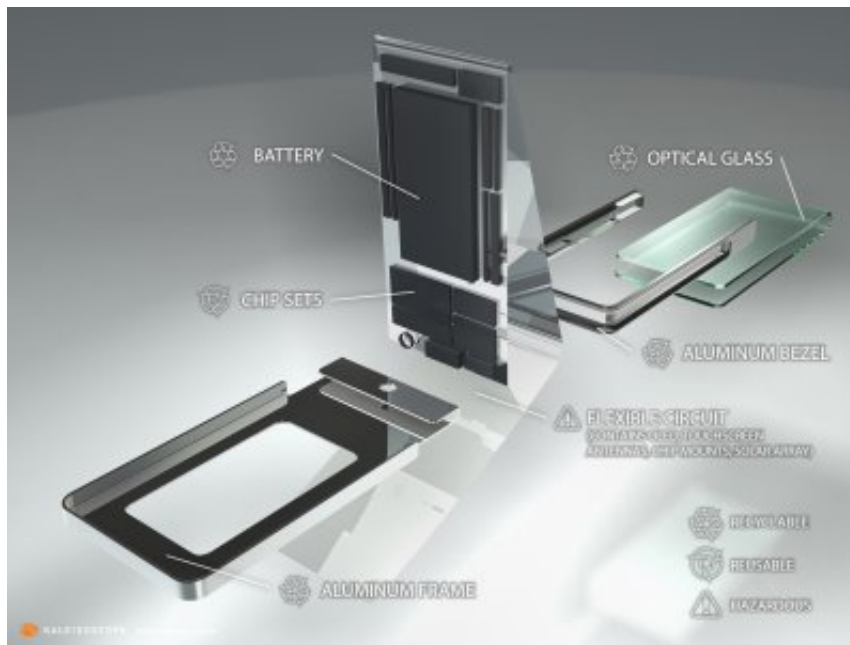
"We produce 70 gallons of ethanol per ton of waste," says engineer Arnold Klann, BlueFire's president and CEO. "The trick is unlocking the sugar molecule from the lignin, which is the glue that holds it together."

BlueFire estimates 40 billion gallons of cellulosic ethanol could be produced from plant waste destined for the landfill, providing as much as one third of all U.S. transportation fuel needs. And, if other forms of waste, such as the stalks of corn plants (corn stover) or the remnants of timber harvest are included, Klann says, "we have enough feedstock in the U.S. to offset 70 percent of the oil import."  
(Source: [Scientific American](http://www.sciam.com/article.cfm?id=trash-based-biofuels))

<http://www.sciam.com/article.cfm?id=trash-based-biofuels>

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**LINC - the lifecycle concept phone**



It's got a cell phone, a media player, a web browser, GPS, downloadable content, Bluetooth, wifi, the latest 3G network. But here's the catch. LINC is leased to the user as a service, not a product. The user holds on to the device for about a year, and when the next generation of hardware comes along, the user receives a new LINC in the mail. The LINC informs the user of their hardware upgrade, wirelessly transfer the digital account, and before being shipped back to the manufacturer, LINC informs the user of the next part of its journey.

LINC is to be shipped back to a regional manufacturing facility. The device contains valuable materials like aluminum, glass, and electronic components that the producer can harvest for re-use. Typically, mobile phones contain hazardous waste that goes into a landfill or are left in a desk drawer to sit in.

LINC is designed for automated disassembly. A directed radiant heat beam targets its internal memory metal latch, releasing the assembly. In one step, LINC automatically disassembles into its few simple components, glass, aluminum and its circuit flex. The glass and aluminum, not containing any paints or adhesives, are easily recycled to pure grade materials for immediate reuse. The remaining flexible circuit contains all the electronics necessary for the entire device. It's full of hazardous materials, but it has been safely recovered for proper disposal. Many of the chip sets can easily be pulled for reuse. Components like the graphics card are out dated for LINC, but can be used in devices like portable gaming systems.

(Source: [The Greener Grass.org](http://www.thegreenergrass.org))

<http://www.thegreenergrass.org/2008/02/linc-lifecycle-concept-phone.html>

## The Maglev - superpowered magnetic wind turbine



Renewable energy produced from the wind has garnered much attention and support in recent years but is often criticized for its low output and lack of reliability. But now a super power wind turbine has come along that may be just what the renewable energy industry needs. The MagLev wind turbine, which was first unveiled at the Wind Power Asia exhibition in Beijing, is expected take wind power technology to the next level with magnetic levitation.

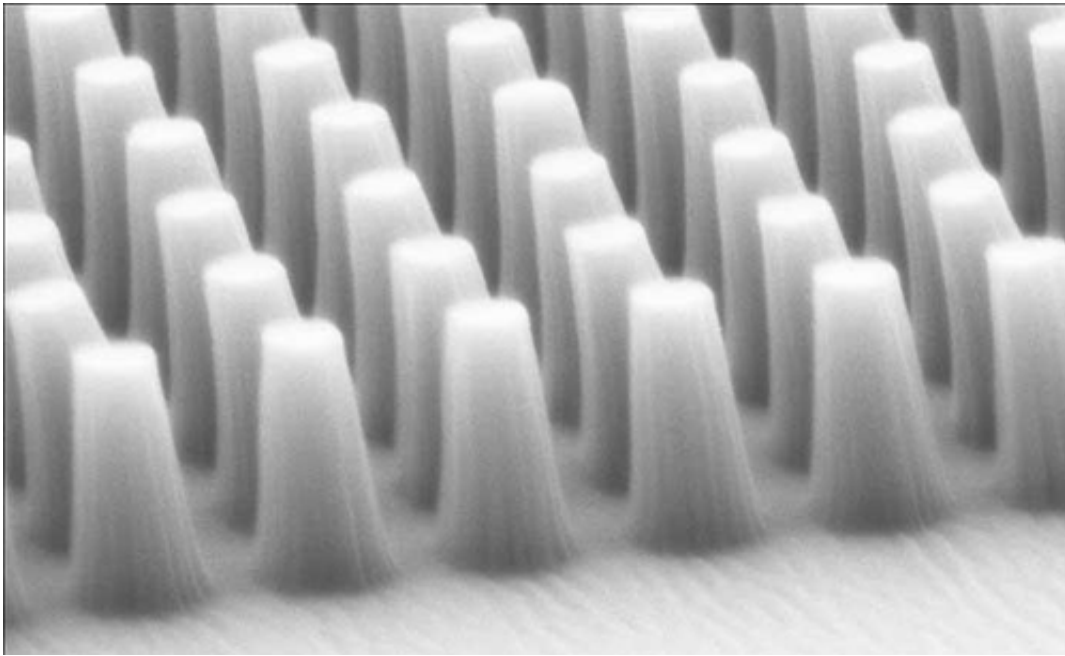
Magnetic levitation is an extremely efficient system for wind energy. Here's how it works: the vertically oriented blades of the wind turbine are suspended in the air above the base of the machine, replacing the need for ball bearings. The turbine uses "full-permanent" magnets, not electromagnets - therefore, it does not require electricity to run. The full-permanent magnet system employs neodymium ("rare earth") magnets and there is no energy loss through friction. This also helps reduce maintenance costs and increases the lifespan of the generator.

Maglev wind turbines have several advantages over conventional wind turbines. For instance, they're able to use winds with starting speeds as low as 1.5 meters per second (m/s). Also, they could operate in winds exceeding 40 m/s. Currently, the largest conventional wind turbines in the world produce only five megawatts of power. However, one large maglev wind turbine could generate one gigawatt of clean power, enough to supply energy to 750,000 homes. It would also increase generation capacity by 20% over conventional wind turbines and decrease operational costs by 50%. If that isn't enough, the maglev wind turbines will be operational for about 500 years! (Source: [Inhabitat](http://www.inhabitat.com/2007/11/26/super-powered-magnetic-wind-turbine-maglev/))

<http://www.inhabitat.com/2007/11/26/super-powered-magnetic-wind-turbine-maglev/>

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**“Gecko-foot” band-aids could promote healing**



Sticky bandages inspired by geckos' feet could soon be used to seal wounds and close surgeon's cuts. Since the bandages would dissolve harmlessly within the body, they could also replace stitches and sutures.

Geckos can walk on walls thanks to nanoscopic bristles, called setae, on the bottom of each foot. Setae produce an intermolecular attraction allowing the gecko's foot to stick to almost any surface.

So when Jeffrey Karp of Brigham and Women's Hospital in Boston, Massachusetts, and colleagues set out to create a better medical tape for closing wounds and cuts, they decided to use structures similar to those on geckos' feet.

Karp and colleagues started by creating a polymer called PGSA - a tough, elastic material that causes little inflammation and biodegrades over a few days or weeks. Then they etched microscopic pillars onto the surface of a sheet made of PGSA, leaving about a million pillars packed into each square millimetre. As with geckos' feet, the pillars' extremely high surface area makes the tape sticky.

Crucially, though, they needed the tape to have a lasting stick, so that it could hold cut tissue together for days or weeks while it heals. As Karp points out, "geckos can adhere and de-adhere. Otherwise you'd see a lot of unhappy geckos hanging around on the walls."

Geckos' feet stick primarily through relatively weak Van der Waals forces, which attract molecules that are close together. To make the tape form more permanent chemical bonds, Karp and colleagues coated the pillars with a thin layer of dextran, a complex sugar that bonds with the surface of tissue. (Source: [New Scientist](http://technology.newscientist.com/article/dn13347-gecko-foot-bandaids-promise-better-healing.html.stm#graphic))

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## RESOURCES

**The World-Wide Telescope**





All astronomy data and literature will soon be online and accessible via the Internet. The community is building the Virtual Observatory, an organization of this worldwide data into a coherent whole that can be accessed by anyone, in any form, from anywhere. The resulting system will dramatically improve our ability to do multi-spectral and temporal studies that integrate data from multiple instruments. The Virtual Observatory data also provide a wonderful base for teaching astronomy, scientific discovery, and computational science.

Many fields are now coping with a rapidly mounting problem: how to organize, use, and make sense of the enormous amounts of data generated by today's instruments and experiments. The data should be accessible to scientists and educators so that the gap between cutting-edge research and education and public knowledge is minimized and should be presented in a form that will facilitate integrative research. This problem is becoming particularly acute in many fields, notably genomics, neuroscience, and astrophysics. The availability of the Internet is allowing new ideas and concepts for data sharing and use. Here we describe a plan to develop an Internet data resource in astronomy to help address this problem in which, because of the nature of the data and analyses required of them, the data remain widely distributed rather than gathered in one or a few databases (e.g., GenBank). This approach may be applicable to many other fields. Our goal is to make the Internet act as the world's best telescope - a World-Wide Telescope.

Visit Microsoft's [World Wide Telescope website](#)

[Watch video](#) of a demonstration of technology from the 2008 TED conference.  
(Source: [Science](#))

<http://www.sciencemag.org/cgi/content/abstract/293/5537/2037>

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**Biomodd: A living game computer as social sculpture**



Biomodd is a social and interactive art project that brings together ecology, game culture and installation art. The work tries to visualise and rework the intricate relation of organic life, technology and consumption. Inspired by the case modding scene, a monumental custom computer is built as a form of expanded sculpture. Inside the case, excess heat of overclocked processors is recycled by an elaborate living ecosystem. The computer hardware is used as server for a new computer game. The objective of this game is to bring some of the main themes of Biomodd into an imaginative multiplayer game experience.

Both the computer structure and the game are developed with a group of biology, game and art enthusiasts. Furthermore, exhibition visitors can also actively modify the piece: through playing they generate heat and hence influence the interior ecosystem.

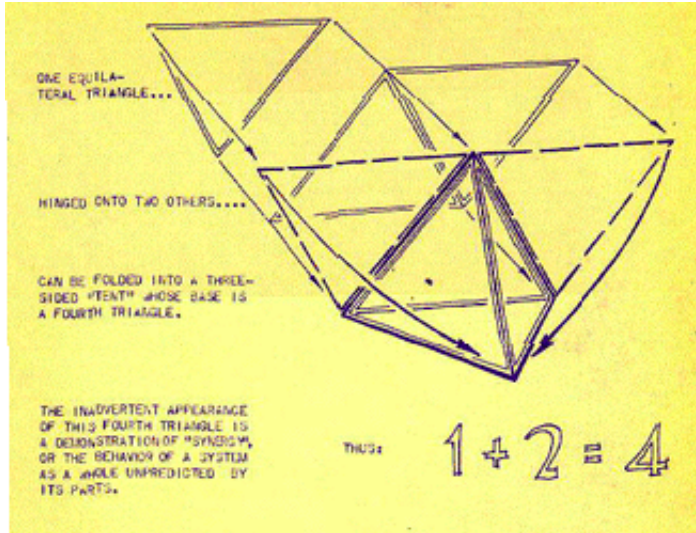
Visit the [project website](#).

[Read an interview](#) with the designer, Angelo Vermeulen.

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## EVENTS

# Special Session on Buckminster Fuller's Synergetics and Mathematics



March 15-16, 2008

Location: Courant Institute of Mathematical Sciences at New York University (NYU), 251 Mercer Street, New York, NY 10012-1185

Price: Fees are US\$40 for AMS or CMS members, US\$60 for nonmembers of the AMS; and US\$5 for students, unemployed mathematicians, and emeritus members. Fees are payable on site by cash, check, or credit card.

This special session will provide a forum for mathematicians and other researchers who have been influenced by Buckminster Fuller's Synergetic Geometry to share their research in building upon Fuller's mathematical work.

For more details, visit the [program homepage](#)

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Have you come across interesting Design Science news articles, resources, or events?

We invite you to forward them so we can consider them for inclusion in future e-bulletins. Send them to: [designsciencenews\(at\)bfi.org](mailto:designsciencenews(at)bfi.org)

If we use your suggestion for future e-bulletins and you would like to be credited by name, please indicate it in your e-mail.

**Thank You!**

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