

R. Buckminster Fuller's Comprehensive Anticipatory Design Science

A dramatic performance and residency
exploring the work of R.B. Fuller

This residency is specially adapted to introduce STEM students to the original STEAM thinker, Bucky Fuller. Adapted from the internationally touring solo drama: *R. Buckminster Fuller: THE HISTORY (and Mystery) OF THE UNIVERSE*, written by DW Jacobs and performed by David Novak, this residency combines Bucky's famous "thinking out loud" presentations with hands-on workshops. Each day begins with a one hour lecture from Bucky followed by small group workshops.

R. Buckminster Fuller: THE HISTORY (and Mystery) OF THE UNIVERSE was developed and received its world premiere production at San Diego Repertory Theatre - March 31, 2000. Use of the name, likeness, and words of R. Buckminster Fuller is by arrangement with the Estate of R. Buckminster Fuller.

Graphic by Mark Hanf

DAVID NOVAK is a leading American storyteller and actor. Mr. Novak has performed as R. Buckminster Fuller at the National Storytelling Festival, The Black Mountain College Museum, North Carolina Stage Company, and Wroclaw University of Technology in Poland.



Fuller first piqued his interest when he was 15. The Apollo mission had landed men on the moon and the entire world now saw itself from space. For years, Buckminster Fuller said “we are all passengers on a beautifully designed spaceship – Earth” and he was right!

Taking on the role of Bucky is now part of David’s repertoire of folktales, ancient myths and original works.

Awarded the Circle of Excellence from the National Storytelling Network, his storytelling programs have appeared at the Lincoln Center, The Disney Institute, The Cincinnati Playhouse, Provincetown Playhouse, and the North Carolina Stage Company. Internationally he has toured China, Poland, Australia, New Zealand, Hong Kong, Singapore, and the Czech Republic.



D. W. JACOBS (Playwright) co-founded San Diego Repertory Theatre with Sam Woodhouse and served as Artistic Director for twenty years. He resigned to focus on writing this play. He lives in Los Angeles, where he recently started a new theater/video company, *TEATRO ARROYO* // *Theater Stream*.

About The Play: Written by D.W. Jacobs in 2000, over a 5 year period, from 1995 to 2000, has since had over 1000 performances in San Diego, San Francisco, Portland, Seattle, Chicago, Ventura, Santa Fe, Phoenix, Asheville, Montreal, Washington, DC (Arena Stage), and Cambridge, MA (ART). The role of Buckminster Fuller has been played by Ron Campbell, Joe Spano, Tom Keys, Rick Foucheux and Thomas Derrah. David Novak took on the title role in 2012. Since that time, Mr. Novak performed the play The National Storytelling Festival, Black Mountain College Museum, and in Wroclaw and Krakow, Poland.

Roam home to dome
No banker would back with a dime
No mortgage to show
No payments to go
Where you dwell, dream, and spend only time.

To learn more:
<https://www.buckminsterfuller.net/resources/play.html>



R. Buckminster Fuller, 1895 - 1983

Hailed as "one of the greatest minds of our times, R. Buckminster Fuller was renowned for his comprehensive perspective on the world's problems. For more than five decades, he developed pioneering solutions that reflected his commitment to the potential of innovative design to create technology that does "more with less" and thereby improves human lives.

Born in Milton, Massachusetts, on July 12, 1895, Richard Buckminster Fuller belonged to a family noted for producing strong individualists inclined toward activism and public service. "Bucky," as he came to be called, developed an early understanding of nature during family excursions to Bear Island, Maine, where he also became familiar with the principles of boat maintenance and construction.

Fuller entered Harvard University in 1913, but he was expelled after excessively socializing and missing his midterm exams. Following his expulsion, he worked at a mill in Canada, where he took a strong interest in machinery and learned to modify and improve the manufacturing equipment. Fuller returned to Harvard in the autumn of 1915 but was again dismissed.

From 1917 until 1919, Fuller served in the U.S. Navy, where he demonstrated his aptitude for engineering by inventing a winch for rescue boats that could remove downed airplanes from the water in time to save the lives of pilots.

As a result of the invention, Fuller was nominated to receive officer training at the U.S. Naval Academy, where he further developed his ability to study problems comprehensively. In 1926, when Fuller's father-in-law, James Monroe Hewlett, developed a new method of producing reinforced concrete buildings, he and Fuller patented the invention, earning Fuller the first of his 25 patents.

In 1927, after the construction company failed, Fuller was unemployed and contemplated suicide, but he had a remarkable realization. Deciding that he had no right to end his own life, he concluded that he had a responsibility to use his experiences and intellect in the service of others. As a consequence, he spent nearly two years as a recluse, deep in contemplation about the universe and how he could best contribute to humanity.

One of Fuller's lifelong interests was using technology to revolutionize construction and improve human housing. In 1927, after inventing an easily built, air-delivered, modular apartment building, he designed the Dymaxion™ House, an inexpensive, mass-produced home that could be airlifted to its location. Originally called the 4D House, it was later renamed by a department store that displayed a model of the house. The word "dymaxion" was coined by store advertisers and trademarked in Fuller's name. Based on the words "dynamic," "maximum," and "ion," it became a part of the name of many of Fuller's subsequent inventions. The word became synonymous with his design philosophy of "doing more with less," a phrase he later coined to reflect his growing recognition of the accelerating global trend toward the development of more efficient technology.

These inventions included the Dymaxion Car, a streamlined, three-wheeled automobile that could make extraordinarily sharp turns; a compact, prefabricated, easily installed Dymaxion Bathroom; and Dymaxion Deployment Units (DDUs), mass-produced houses based on circular grain bins. While DDUs never became popular for civilian housing, they were used during World War II to shelter radar crews in remote locations with severe climates, and they led to additional round housing designs by Fuller.

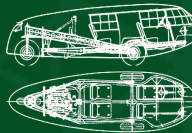
Source: [*The Estate of R. Buckminster Fuller*](#)



Spaceship Earth - a worldview popularized by Fuller and others that redefines humanity's integral role as the crew of our living spaceship, perpetually moving through the universe. Fuller wrote a book called *Operating Manual for Spaceship Earth* in 1968 and often said, "We are all astronauts aboard a beautiful little spaceship called Earth."



Dymaxion House - a series of prefabricated, architectural prototypes, designed by Fuller between 1929-1945 that integrated aluminum panels, water collection, natural convection ventilation, and manifold plumbing systems. The Dymaxion House was the first conscious attempt to create an autonomous dwelling that was easily transported and assembled.



Dymaxion Car - a three-wheeled, eleven passenger, concept car designed in 1933 by Fuller. The Dymaxion Car was extremely aerodynamic and fuel efficient, getting over 30 miles to the gallon, with a top speed of 90 miles per hour.



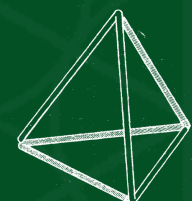
Geodesic Dome - a unique architecture, popularized by Buckminster Fuller, based on a lattice of great circles on the surface of a sphere that intersect to form triangular elements. Fuller constructed his first domes in 1948 and 1949 with students at Black Mountain College. The geometry of a geodesic dome creates an extremely stable structure that encloses the greatest volume of space with minimal surface area and building materials.



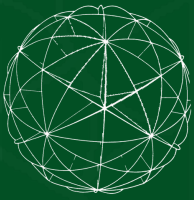
Fuller Projection World Map - a projection of a world map onto the surface of an icosahedron, a twenty sided geometric form, which can be unfolded and flattened to two dimensions. The "Dymaxion" map presents one of the most accurate projections of the Earth's surface in regards to the shapes and sizes of the continents. The projection also depicts the earth's continents as "one island," in one continuous ocean system, a beautiful symbol of our interconnected Spaceship Earth.



Synergetic Geometry - in a two volume set entitled: *Synergetics 1&2*, Fuller explored the relationships of geometric systems in transition that includes geodesics, platonic solids, closest packing of spheres, and "jitterbug" transformations.



Synergy - is two or more things functioning together to produce a result not independently obtainable. The term synergy comes from the Greek word *synergia*, meaning "working together". Fuller popularized this term as it relates to systems in nature and mathematics.



World Game - An interactive educational experience on a large Dymaxion Map that explored global systems and resources created by Buckminster Fuller and colleagues, including Medard Gabel. The idea was to "make the world work for 100% of humanity in the shortest possible time through spontaneous cooperation without ecological damage or disadvantage to anyone", thus increasing the quality of life for all people.



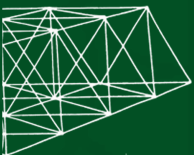
Future Artifacts - Fuller was well aware that his inventions and designs were ahead of his time. He consciously labeled them "Future Artifacts", predicting that when society realized the need for efficient, ecological designs, that his work would be "dug up" and put into practice.



Chronofile - a very large scrapbook in which Fuller documented his life and work from 1920 to 1983. The Chronofile contains copies of all correspondence, bills, notes, sketches, and clippings from newspapers. The total collection is estimated to be 270 feet (80 m) worth of paper. This is said to be the most documented human life in history. The Dymaxion Chronofile is now housed at Stanford University as part of the Fuller Archives and is currently being digitized for public access.



Tensegrity - A combination of "tension" and "integrity," Tensegrity is an architectural and sculptural principle, based upon Fuller's work with Kenneth Snelson, at Black Mountain College, that explores the interdependent relationship between tension and compression within a structure.



Comprehensive Anticipatory Design Science - Fuller defined himself as a "comprehensive anticipatory design scientist". Throughout his career he promoted integrated thinking instead of specialization; forward-looking exploration in order to plan for the future; and the synthesis of art and science.



Doing More With Less - Fuller was constantly searching for ways to design and build with a more efficient use of resources. Radical questions like, "How much does this building weigh?", inspired the sustainable design movement of today.

"CALL ME TRIMTAB."
- BUCKY

Trimtab - a metaphor, regularly used by Fuller, to explain the individual's ability to affect great change. A trim tab is a tiny, movable surface at the edge of a large rudder. Moved with minimal effort, a trim tab builds a low pressure that pulls the rudder around and thus changes the direction of the large ship. "So I said that the little individual can be a trim tab. Society thinks it's going right by you, that it's left you altogether. But if you're doing dynamic things mentally, the fact is that you can just put your foot out like that and the whole big ship of state is going to move. So I said, call me Trim Tab."

Graphic by Mark Hanf

Selected Reading and Web Resources

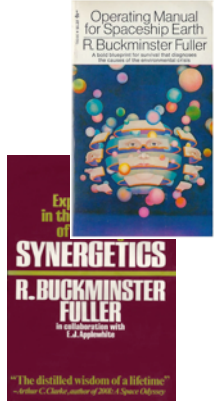
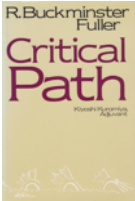
Books by R. Buckminster Fuller:

Fuller, R. Buckminster, and Jaime Snyder. *Operating Manual for Spaceship Earth*. Lars Müller Publishers, 2017.

[A good starting point for understanding Bucky's world view and approach to design science.]

Fuller, Richard Buckminster. *Critical Path*. St. Martins Press, 1981.
[One of Bucky's last books. Most accessible and comprehensive.]

Fuller, R. Buckminster. *Grunch of Giants*. Design Science Press, 2008.
[Bucky's critique of our legal and financial system]



Fuller, Richard Buckminster. *Synergetics: Explorations in the Geometry of Thinking*. Macmillan U.a., 1983.

For a comprehensive list of Bucky's other books:

"Books by Fuller." *Buckminsterfuller.net*, www.buckminsterfuller.net/publications/books-by-fuller.html.

Books About R. Buckminster Fuller:

Eastham, Scott. *American Dreamer: Bucky Fuller and the Sacred Geometry of Nature*. Lutterworth, 2007.

Edmondson, Amy. *Fuller Explanation*. Emergentworld, Llc, 2009.

[*This is the best book to start with for understanding Bucky's Synergetics.]

Fuller, R. Buckminster, and Richard J. Brenneman. *Fullers Earth: a Day with Buckminster Fuller and the Kids*. New Press, 2009.

Kenner, Hugh. *Bucky: a Guided Tour of Buckminster Fuller*. William Morrow, 1974.

Sieden, Lloyd Steven. *Buckminster Fullers Universe*. Perseus Pub., 2000.

A comprehensive biography listing Fuller's honorary degrees, awards, patents and more:

<https://www.buckminsterfuller.net/ewExternalFiles/RBF%20Basic%20Bio.pdf>

Other Media Resources:

"Buckminster Fuller - Everything I Know - Session 01 (Entire) - January 20, 1975." *YouTube*, 26 May 2011, youtu.be/o6yaSLipeWg. [An epic video series featuring Bucky himself.]



"Energy Slaves Comic about Buckminster Fuller - by Stuart McMillen." *Stuart McMillen Comics*, www.stuartmcmillen.com/comic/energy-slaves/#page-1.

[An excellent graphic explanation of Bucky's energy concepts.]

"Ephemeralization - Doing More with Less - Buckminster Fuller (Animated Clip)." *YouTube*, 26 Dec. 2013, youtu.be/X8lqnO7aYe0.

[Good animation depicting the design process of "doing more with less."]

