## An Intersection of Art and Physics

## **Use of Language**

Warren W. Buck University of Washington Bothell and Seattle

Homecoming Event Lecture Alumni Association College of William and Mary October 26, 2007

















## Finding a language to express my present genre of art.

## For some, art and physics are very disparate Physics is so analytical and art so non-analytical and evocative Left brain and right brain metaphoric assignments of folks

**For others**, there are many overlaps such as Notes on a violin or guitar string and frequency, Notes from a horn and harmonics Wave lengths and color Movement and forces Illustrations

**I find** art and physics have commonality/connectivity It is the language we use that separates things (into not so neat categories); not necessarily the things themselves Since we have language,

how we use it makes a huge difference in our mutual understanding or lack thereof

Using language to explain o

to explain connectivity is non-trivial if not down right impossible

Everything changes;

yet, we are often reluctant to accept these changes when they first enter our consciousness

# <u>Tools</u>

#### For physicists such as myself

Outcome is obtained employing:

Inspiration and motivation and freedom to work Connecting all dynamical and equilibrium states to mathematical expressions and empirical detectability and awareness

#### For a painter such as myself

Outcome is obtained employing:

Inspiration and motivation and freedom to work Connecting all images to drawings, paints, brushes, and surfaces to paint on

## "Desired" Outcome

Advance the human perspective on where we live

Create new language/dialect where needed

and

## connect art with science

# Historical Perspective of art with science



Mummification Ca 2500 BC



Egyptian Pyramid building

In this 1559 anatomical plate by Juan Valverde de Amusco, a figure holds a knife in one hand and his own skin in the other.

> http://en.wikipedia.org/wiki/History\_ of\_anatomy



David Teniers (1610-1690) The Alchemist, c.1645.



#### The Astronomer Johannes Vermeer C 1668

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Vitruvian Man Leonardo Da Vinci (1471-1528)

#### Heaven and Earth

Marcus Vitruvius Pollio (born ca. 80/70 BC?; died ca. 25 BC) was a <u>Roman writer</u>, <u>architect</u> and <u>engineer</u>

#### A mathematical algorithm!

#### "Ich aber quadriere den Kreis ..." Leonardo da Vincis Proportionsstudie by Klaus Schröer / Klaus Irle 148 pages, 61 pictures MV-Verlag, Münster ISBN: 978-3-86582-547-6



drawing of a flying machine, Leonardo da Vinci, 1488



Design for a Flying Machine Da Vinci c. 1505





Studies of Water passing Obstacles and falling, Da Vinci c. 1508-9





Shadowgraph (**Schlieren photography**) of a .22-caliber bullet in flight Taken by an MIT freshman in 1962, in Edgerton's lab. The flash was triggered by the shock wave (shown) hitting a microphone (out of frame). The picture shows no solid object except the bullet.



#### Stroboscope photography



 $J^{\mu} = (G_{F}/\sqrt{2}) V_{us} [f_{+}(q^{2})(P_{K} + P_{\pi})^{\mu} + f_{-}(q^{2})(P_{K} - P_{\pi})^{\mu}]$ 



## prototype seven-cell superconducting accelerating cavity



# LHC

#### Art Mirrors Physics Mirrors Art

Einstein, Picasso: Space, Time, and the Beauty That Causes Havoc Arthur I. Miller Basic Books (Perseus), New York, 2001. \$30.00 (357 pp.). ISBN 0-465-01859-X

2001 Physics Today Review



**Les Demoiselles d'Avignon:** Picasso's 1907 excursion into a fourth dimension.

#### **ICTP News**

#### 13/6/2006 Science Cafe on Physics and Art

Filed under: Scientific Events

— editor @ 9:09 am

"Science is art" is the title of the Science Café that will be held today, 13 June, at 6 pm, at Caffè San Marco (via Cesare Battisti 18, Trieste). Claudio Tuniz, ICTP Assistant Director, and Gianrossano Giannini, professor of physics at the University of Trieste, will discuss how physicists and acheologists are now working together to improve our understanding of the past, and to solve many historical mysteries. Music and readings will enrich the event.

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Jérôme Basserode's huge spinning tops are some examples of Signatures of the Invisible, a joint project by CERN and the London Institute, the world's largest college of art and design.

Feb 2002







"The Peanut" Not quite L = 1 orbital outside Physics-Astronomy Building University of Washington, Seattle






Lylie Fisher "Beauty bubbles through" Symmetry Magazine V03, issue10, Dec 2006



Hubble's view of The Orion Nebula





Sea shell based on logarithmic spiral – created with fractals by Clifford Pickover Art and Physics



## Caustic I by Eric Heller

http://www.ericjhellergallery.com/



Winner 2004 Visualization Challenge

Water Permeation Through Aquaporins Emad Tajkhorshid and Klaus Schulten, Theoretical and Computational Biophysics Group, University of Illinois, Urbana-Champaign



Self Portrait – Developing Underwater Painting On the ocean floor in the Bahamas 1981-83

#### Painted in watercolor above sea level





 $Underwater colour \ 2 \ ({\rm oil \ on \ wood})$ 

# FIFTH ANNUAL HUGS AT CEBAF

MAY 29 - JUNE 16, 1990



# My Approach to Building the Language

Create art language using symbols and ideas of physics/mathematics

Can express emotions, space, relations, etc from the phrases of this new art language

With language, we are all trying to express ourselves and hear others

## My Approach to Building the Language

Create art language using symbols and ideas of physics/mathematics

Can express emotions, space, relations, etc from the phrases of this new art language

We are all trying to express ourselves with language



Ωmega Art<sup>©</sup>

































































































































\*









A few mV (10<sup>-3</sup> Volts) potential in a nerve cell





A few mV (10<sup>-3</sup> Volts) potential in a nerve cell





## Gives rise to a magnetic field pointed out of the page
































## Thank you very much!



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Artend Physics

Art and Physics

Language separates things by labeling: this is a napkin, this is a plate I am Warren, you are Cate I have long slim fingers you have short stout fingers and so on

In visual art – surrealism is different from impressionism this is cerulean blue, this is cadmium red this is a nude, I have no idea what that is

In physics – this is nuclear, that is electromagnetic this is spectroscopy, that is a lens this is length, that is mass

The language describes how we use things and how we distinguish And is, by definition, distinctly separate.

It's no wonder we run into difficulties translating and interpreting language Or worse, trying to speak/write about what we perceive that is different from the norm

I am still struggling to speak American; yet there is reason to speak other languages. Can we ever learn to hold the density of disparate things as an understandable collective?