PART ONE – The Holographic Universe Workshops

Welcome to the Holographic Universe.

This is Part 1 of a 5-part workshop series designed to examine how quantum physics and recent scientific experiments are radically changing our understanding of life, our reality, and our spirituality.

For example, in January of 2012, scientists at the GEO 600 gravitational wave detector in Germany announced they now had scientific evidence that the entire Universe is a holographic projection around the Earth. We'll take a look at that claim in detail later in this workshop.

But first, imagine, if you can, living 500 years ago when many people thought the Earth was flat, and we based our opinions, beliefs, judgments and fears on that one elementary but very mistaken premise, like falling off the edge of the world if you sailed too far west from Portugal, and how that limited human lives and experiences.

When we found out the Earth was round, we had to make some serious adjustments in our thinking. But unfortunately, you're going to discover in this workshop series that we simply traded one set of limiting beliefs for another.

Well, we're at a turning point in history once again, and I want to share with you this revolutionary idea that we are living in a holographic universe, and explore what that will mean in our everyday lives.

Which brings up the question... who am I? And what are my qualifications to present this workshop?

My name is Stephen Davis… and that's really all you need to know… because **I** am not the one who will be speaking to you today. Although you will be hearing my voice, you will not be listening to **my** beliefs or my opinions or my theories because **I** am **not** an expert in quantum physics. I'm simply the messenger. My job is to bring you the message that the Earth is round and show you the scientific evidence for it. And I'm qualified to do that mainly because I have sailed around the world and experienced it for myself.

But to present the scientific evidence is a different matter, and to do that I have brought with me the real experts to talk to you about quantum physics, through video clips and audio files and quotes from their books. I want you to hear all of this directly from them, and then if you disagree with something you hear, you'll have to argue with the experts, and not with me!

For example, in 1991 Michael Talbot wrote a book called *The Holographic Universe*. Unfortunately Michael died in 1992, just a year later. So this book is already twenty years out of date, and there's been a lot that's happened during that time in this field. But still,

it's one of the best books I know to get started, and you'll be hearing a lot of quotes from it during these workshops.

You'll also be hearing quotes from *The Field,* by Lynne McTaggert, another excellent basic introduction to the subject.

And you'll be meeting and hearing from a lot of different experts – mainly physics professors at various colleges and universities from all over the world, such as...

~ David Bohm, renowned quantum physicist at Princeton University
~ Karl Pribram, Neurophysiologist, Georgetown University
~ David Albert, Director of Philosophical Foundations of Physics, Columbia University
~ Richard Feynman, Professor of Theoretical Physics, California Institute of Technology
~ John Hagelin, Physics Professor at Maharishi University
~ Stuart Hameroff, Associate Director of the Center for Consciousness, University of Arizona
~ Nick Herbert, Assistant Professor of Physics, Monmouth College
~ Miceal Ledwith, Professor of Systematic Theology, Maynooth College, Ireland
~ Andrew Newberg, Director of the Center for Spirituality and the Neurosciences, University of Pennsylvania
~ Dean Radin, Professor, Saybrook Graduate School
~ Jeffrey Satinover, Teaching Fellow in Physics, Yale University
~ Leonard Susskind, Professor of Theoretical Physics, Stanford University
~ William Tiller, Professor Emeritus, Stanford University
~ Fred Alan Wolf, author of "Taking the Quantum Leap" and "Parallel Universes"
~ Brian Greene, Professor of Theoretical Physics, Columbia University

and many, many more.

But I want to introduce you first to Dr. Amit Goswami. Dr. Goswami is

- Professor Emeritus in theoretical physics at the University of Oregon
- Senior Scholar in Residence at the Institute of Noetic Sciences
- Author of 9 books on Quantum Physics, including "The Self-Aware Universe" and "Science and Spirituality: A Quantum Integration."

Listen carefully to what Dr. Goswami has to say...

"This is the only radical thinking that you need to do. But it is so radical, it's so difficult, because our tendency is that the world is already 'out there,' independent of my experience. It is not. Quantum physics has been so clear about it…"

You'll be hearing that quote probably a half-dozen times over the course of these workshops, and each time you hear it, it will make more and more sense.

But now let's begin by taking a trip into outer space, and then back into inner space with a video called the Powers of Ten.

"A picnic near the lakeside in Chicago is the start of a lazy afternoon, early one October. We begin with a scene one meter wide, which we view from just one meter away. Now every ten seconds we will look from ten times farther away and our field of view will be ten times wider.

"This square is ten meters wide, and in ten seconds the next square will be ten times as wide. Our picture will center on the picnickers, even after they've been lost to sight.

"One-hundred meters wide – the distance a man can run in ten seconds. Cars crowd the highway, power boats lie at their docks. The colorful bleachers are Soldier Field.

"This square is a kilometer wide – 1,000 meters, the distance a racing car can travel in ten seconds. We see the great city on the lake shore.

"10^4 meters – 10 kilometers – the distance a supersonic airplane can travel in ten seconds. We see first the rounded end of Lake Michigan, then the whole Great Lake.

"10^5 meters – the distance an orbiting satellite covers in ten seconds. Long parades of clouds – the day's weather in the Middle West.

"10^6 – a '1' with 6 zeros – a million meters. Soon the Earth will show as a solid sphere.

"We are able to see the whole Earth now, just over a minute along the journey. The Earth diminishes into the distance, but those background stars are so much farther away that they do not yet appear to move.

"A line extends at the true speed of light. In one second it half crosses the tilted orbit of the moon.

"Now we mark a small part of the path in which the Earth moves about the sun. Now the orbital paths of the neighbor planets: Venus, and Mars, then Mercury.

"Entering our field of view is the glowing center of our solar system, the sun, followed by the massive outer planets, swinging wide in their big orbits. That outer orbit belongs to Pluto.

"A fringe of the myriad comets too faint to see completes the solar system.

"10^{14} – as the solar system shrinks to one bright point in the distance, our sun in plainly now only one among the stars.

"Looking back from here we note four southern constellations, still much as they appear from the far side of the Earth.

"This square is 10^{16} – one light year – not yet out to the next star. Our last 10 seconds' step took us ten light years further. The next will be a hundred. Our perspective changes so much in each step now that even the background stars will appear to converge.

"At last we pass the bright star Arcturus, and some stars of the Dipper. Normal, but quite unfamiliar stars and clouds of gas surround us as we traverse the Milky Way galaxy.

"Giant steps carry us into the outskirts of the galaxy, and as we pull away we begin to see the great flat spiral facing us. The time and path we chose to leave Chicago has brought us out of the galaxy along a course nearly perpendicular to its disk.

"The two little satellite galaxies of our own are the Clouds of Magellan.

"10^{22} – a million light years. Groups of galaxies bring a new level of structure to the scene. Glowing points are no longer single stars, but whole galaxies of stars seen as one.

"We pass the big Virgo cluster of galaxies, among many others, a hundred-million light years out.

"As we approach the limit of our vision, we pause to start back home.

"This lonely scene – the galaxies like dust – is what most of space looks like. This emptiness is normal. The richness of our own neighborhood is the exception.

"The trip back to the picnic on the lakefront will be a sped-up version, reducing the distance to the Earth's surface by one power of ten every two seconds. In each two seconds we'll appear to cover 90% of the remaining distance back to Earth. Notice the alternation between great activity and relative inactivity, a rhythm that will continue all the way into our next goal: A proton in the nucleus of a carbon atom beneath the skin on a hand of the sleeping man at the picnic.

"10^{9} meters, 10^{8}... seven, six, five, four, three, two, one. We are back at our starting point.

"We slow up at one meter – 10^{0}.

"Now we reduce the distance to our final destination by 90% every ten seconds, each step much smaller than the one before.

"At 10^{-2} – one one-hundredth of a meter, one centimeter – we approach the surface of the hand. In a few seconds we'll be entering the skin, crossing layer after layer, from the outermost dead cells into a tiny blood vessel within. Skin layers vanish in turn, an outer layer of cells, Felty collagen.

"A capillary containing red blood cells and a rough lymphocyte. We enter the white cell. Among its vital organelles, the porous wall of the cell nucleus appears. The nucleus within holds the heredity of the man in the coiled coils of DNA.

"As we close in, we come to the double-helix itself, a molecule like a long twisted ladder whose rungs of paired bases spell out twice, in an alphabet of four letters, the words of the powerful genetic message.

"At the atomic scale, the interplay of form and motion becomes more visible.

"We focus on one commonplace group of three hydrogen atoms bonded by electrical forces to a carbon atom. Four electrons make up the outer shell of the carbon itself. They appear in quantum motion as a swarm of shimmering points.

"At 10^{-10} meters – one angstrom – we find ourselves right among those outer electrons. Now we come upon the two inner electrons, held in a tighter swarm.

"As we draw towards the atom's attracting center, we enter upon a vast inner space.

"At last the carbon nucleus, so massive and so small. This carbon nucleus is made up of six protons and six neutrons. Here in the domain of universal modules, there are protons and neutrons in every nucleus, electrons in every atom, atoms bonded into every molecule out to the farthest galaxy.

"As a single proton fills our screen, we reach the edge of present understanding."

You can see that "outer space" and "inner space" look very much alike – lots of "empty space."

This video was made in 1977. As technology improved, scientists kept going deeper and deeper, and they found smaller and smaller "particles" and more and more "empty space."

"We were all taught in school that the world is made of stuff – of matter, of mass, of atoms. Atoms make up molecules, molecules make up materials, and everything is made of that. But atoms actually are mostly empty. For example, if this ball were the nucleus of an atom – a proton in a hydrogen atom, for example – then the electron circling this, which would describe the outer limits of that atom, would be out by that mountain over there, roughly twenty miles away, and everything in between is empty. In fact, the universe is mostly empty.

"Within all the atoms and molecules – all the space within them – the particles take up an insignificant amount of the volume of an atom."

Dr. William Tiller said, "Within all the atoms and molecules – all the space within them – the particles take up an insignificant amount of the volume of an atom."

But it's the particles that supposedly make up "matter," so scientists focus on them in their experiments, and as the research continued, scientists discovered that the very small

particles they were finding did not behave as they were supposed to. Basically, Newtonian Physics only worked well on large objects – objects we can see with our naked eyes – but not on a sub-atomic level.

This was the beginning of Quantum Physics, and the most famous experiment that got everyone opening their minds to new possibilities about the universe and how it works is called the Double Slit Experiment. Here is a cartoon that explains what happened in that experiment.

Meet Captain Quantum….

"And here we are… the granddaddy of all quantum weirdness. The infamous Double Slit Experiment.

"The first people who did these experiments, and these experiments, you know, experiments, crude experiments of this kind were first performed almost 50 years ago – or more, 60 years ago. Those people were flabbergasted.

"To understand this experiment, we first need to see how particles – or little balls of matter – act. If we randomly shoot a small object – say, a marble – at the screen, we see a pattern on the back wall where they went through the slit and hit.

"Now if we add a second slit, we would expect to see a second band duplicated to the right.

"Now let's look at waves. The waves hit the slit and radiate out striking the back wall with the most intensity directly in line with the slit. The line of brightness on the back screen shows that intensity. This is similar to the line the marbles make.

"But when we add the second slit, something different happens.

"If the top of one wave meets the bottom of another wave, they cancel each other out. So now there is an interference pattern on the back wall. Places where the two tops meet are the highest intensity – the bright lines – and where they cancel, there is nothing.

"So when we throw things – that is, matter – through two slits, we get this…. two bands of hits. And with waves, we get an interference pattern of many bands.

"Good, so far. Now, let's go quantum.

"An electron is a tiny, tiny bit of matter, like a tiny marble. Let's fire a stream through one slit…. It behaves just like the marble… a single band.

"So if we shoot these tiny bits through two slits, we should get, like the marbles, two bands.

"What? An interference pattern? We fired electrons – tiny bits of matter – through, but we get a pattern like waves, not like little marbles. How? How could pieces of matter create an interference pattern like a wave? It doesn't make sense.

"But physicists are clever. They thought, 'maybe those little balls are bouncing off each other and creating that pattern.' So they decide to shoot electrons through one at a time. There is no way they could interfere with each other.

"But after an hour of this, the same interference pattern is seen to emerge.

"The conclusion is inescapable…. The single electron leaves as a particle, becomes a wave of potentials, goes through both slits and interferes with itself, to hit the wall like waves."

Let's make sure we understand this Double Slit experiment so far…

When we shoot matter – like a BB or a marble – at a barrier with two slits, we get two bright streaks on the screen behind in line with the slits, like this…

And when we shoot waves – like waves of water – through a barrier with two slits, one wave becomes two waves on the other side of the barrier.

And when two waves hit, they interfere with each other….

If the top of one wave aligns with the top of another wave, it's called "constructive interference," and the result is a new and bigger wave.

But if the top of one wave aligns with the bottom of another wave, it's called "destructive interference," and the result is that they cancel each other out and there's no wave at all.

…and when constructive and destructive interference happen together, you get an interference pattern on the back screen that looks like this…

Now, if we shoot an electron – which we have always thought of as a particle – a little piece of matter – through a barrier with two slits, you would think we would get a pattern on the back screen that particles make, like this….

But we don't! Instead we get an interference pattern that waves make, like this…

The conclusion is that electrons, which are the building blocks of what we call "reality," are not solid particles at all, but exist as waves as well. In this wave form, they are called "quanta," which is why the study of how they behave is called "quantum physics."

But that's not the end of the Double Slit Experiment. Let's rejoin Captain Quantum where he left off….

"The conclusion is inescapable…. The single electron leaves as a particle, becomes a wave of potentials, goes through both slits and interferes with itself, to hit the wall like waves.

"Physicists were completely baffled by this. So they decided to peek and see which slit it actually goes through. They put a measuring device by one slit to see which one it went through, and let it fly.

"But the quantum world is far more mysterious than they could have imagined. When they observed, the electron went back to behaving like a little marble. It produced a pattern of two bands, not an interference pattern of many. The very act of measuring, or observing, which slit it went through meant it only went through one, not both. The electron decided to act differently, as though it was aware it was being watched.

"So the electron is very peculiar. An electron is very peculiar in the sense that when you're not looking, the electron can be here, can be there, or can be over there in the corner of this room. It can be all over this room, so to speak. But whenever we look – this is the strange thing about this electron – whenever we look we always find them to be in one particular Geiger counter although we have a room full of Geiger counters. We never hear the Geiger counters ticking all over the room. This is the fundamentally important stuff about the electrons.

"It was here that physicists stepped forever into the strange netherworld of quantum events. What is matter? Marbles? Or Waves? And waves of what? And what does an observer have to do with any of this? The observer collapsed the wave function simply by observing.

"Particles aren't really what they seem to be. They're momentary manifestations – momentary 'poppings' of this deeper imaginary realm, this wave-like realm, this 'implicate order' as David Bohm would say it, this quantum wavy function as quantum physicists might talk about it in which there is no particle. There's just this waviness which can spontaneously pop out as a particle."

Once again, let's make sure we understand, because this is so important…

As we said earlier, when we shoot an electron toward a barrier with two slits without watching what it does at the barrier, we get an interference pattern, like this….

But when we watch – or measure – what happens at the barrier, the electron becomes a particle again and makes a particle pattern on the screen behind, like this…

In physics, this is called "the measurement problem," because the nature of an electron changes when you look at it or try to measure it. It collapses from being a wave into a particle in a specific location in space and time, which is what we see as "reality." This is called "collapsing the wave function." Remember that term, "collapsing the wave function," because we'll talk more about it later.

This means that an electron – the core element of what we call our solid "physical reality" – is only a solid particle, is only **matter** when someone is looking at it. Otherwise, it's a **wave**, and not solid at all.

In his book, *The Holographic Universe*, Michael Talbot said, "There is compelling evidence that the only time quanta [electrons] ever manifest as particles is when we are looking at them. When an electron isn't being looked at, it is always a wave."

To put it the other way around, the natural state of an electron is as a wave. It only pops out of its wave state to form a particle in a specific location in space and time when it is being observed. Then, when it's not being observed, it goes back into its wave state.

But it turns out that it's not just the electrons that pop in and out of existence.

Listen to Dr. Jeffrey Satinover….

"Matter is not what we have long thought it to be. To the scientist matter has always been thought of as sort of the ultimate in that which is static and predictable.

"We like to think of space as empty and matter as solid. But in fact there is essentially nothing to matter whatsoever. It's completely insubstantial.

"Take a look at an atom. We think of it as kind of a hard ball. Then we say, "Oh, well, no, not really. It's this little tiny point of really dense matter right at the center surrounded by a kind of fluffy probability cloud of electrons popping in and out of existence.

"But then it turns out that that's not even right. Even the nucleus, which we think of as so dense, pops in and out of existence just as readily as the electrons do."

Dr. Satinover said, "Even the nucleus [of an atom], which we think of as so dense, pops in and out of existence just as readily as the electrons do."

So it is not only the electrons that exist as waves and then pop into a specific location in space and time when they are observed, but also the nucleus; and the most recent research has even found that whole atoms and molecules do the same thing.

Physicist Nick Herbert says this means that the world behind our back – where we are not looking and cannot observe – is always "a radically ambiguous and ceaselessly flowing quantum soup." But whenever we turn around and try to see the soup, our glance instantly freezes it and turns it back into "reality."

Herbert believes this makes us all a little like Midas, the legendary king who never knew the feel of silk or the caress of a human hand because everything he touched turned to gold. Likewise, we can never really know the true nature of the quantum universe because every time we try to observe it, it turns into matter.

Richard Feynman, a physics professor at the California Institute of Technology, is reported to have said that if you really understand this Double Slit experiment, you can understand all of quantum physics.

You will hear me say fairly often that one of the best clues, or hints, about how our universe actually works can be found in our kids' video games. Right now, take a short look at a game called "MineCraft."

"Oh, man. Here we go, people... Minecraft... let's play.... ohhh...

"I can't believe I've never done this before. This game is the sweetest game, man. Oh, it is so awesome... Well, I'm so, so excited to get started, guys. I hope you're going to enjoy this series as much as I'm going to enjoy playing it. And, um, today we're just going to set up for the first night. We're going to try to make sure we find a good little pad, and.... oh, god! I think I broke something!

"We're going to look for a nice place to start up and... oooouuu! Oh, God! Oh, God! Oh, God!

"This is perfect, guys, this is absolutely perfect for a house. I'm going to build my house right into the side of this mountain, and when we come out of the house, we're going to come out with this amazing view of what can only be described as a rainforest. Umm.. you know what I'm saying... oh my god, this is so awesome. This is perfect. Yes, I think I want...yes, this is perfect. What? Is there is tree above me? Oh my god, the sun is going down. The sun be going down...."

Notice that when the Player passes an object or turns in a new direction, whatever he had been looking at before disappears. Where does it go? Take a quick look again, and then we'll talk a lot more about that later…

"Oh, man. Here we go, people... Minecraft... let's play.... ohhh...

"I can't believe I've never done this before. This game is the sweetest game, man. Oh, it is so awesome... Well, I'm so, so excited to get started, guys. I hope you're going to enjoy the series as much as I'm going to enjoy playing it."

Basically, unless the Player is looking at something in the video game, it doesn't exist. It disappears, only to pop back up later if the Player looks at it again. This is how quantum physics is telling us that our reality works as well.

It means that our reality is not as real as we have always thought it was. Instead, as you hear many quantum physicists say, "it pops in and out of existence."

So… if matter is not solid, and reality is not "real," what IS this physical universe that we experience and think of as so "solid" – that looks and feels so real to us?

Two models have been developed to answer that question…

- One is The "Field"
- and the other is The "Holographic Universe"

We're going to take a close look at both of those models, starting with the Field.

When we speak of an electron existing as a "wave," it isn't like an ocean wave, or a radio wave. It is more like a wave of possible locations where the electron could end up as a particle when it is observed – it's a wave of possibilities.

This "wave of possibilities" in which the quantum world exists has been called many names over the years, such as…

- the "quantum wave function", which you heard Fred Alan Wolf talk about
- the "implicate order" – which was David Bohm's term
- the "Planck Scale" – named after Dr. Max Planck. (These scientists apparently like to name things after themselves.)
- the "zero point field" – named, of course, for Dr. Zero Point
- the "superstring field"
- the "unified field"

Mainly it is just called "the Field." It is a field of unlimited possibilities out of which everything is created.

Lynne McTaggart, author of *The Field*, defines it as "a field of all possibility."

In other words, everything you can think of, and everything you can't think of, and everything no one has thought of yet, already exists in wave form in the Field.

"Progress in our understanding of the universe through physics over the past quarter century has been exploring deeper levels of natural law, from the macroscopic to the microscopic, from the molecular to the atomic to the nuclear to sub-nuclear levels of nature's functioning – the so-called electroweak unified scale, grand unified scale, super unified scale, And what we've discovered at the core basis of the universe, the foundation of the universe, is a single universal field of intelligence – a field which unites gravity with electromagnetism (light), with radioactivity (with the nuclear forces). So that all the forces of nature and all the so-called particles of nature – quarks, leptons, protons, neutrons – are now understood to be just different ripples on a single ocean of existence.

"It's called the Unified Field, or Superstring Field – a single universal field of intelligence, an ocean of existence at the basis of everything – mind and matter. And all the so-called particles of the universe, the forces in our universe, everything in the universe are just ripples on that ocean of existence.

"That's the Unified Field, and that Field is a non-material field. Planets, trees, people, animals – we're all just waves of vibration of this underlying unified superstring field.

"We're really living in a 'thought' universe, a conceptual universe. Quantum mechanics is just the play and display of potentiality. So the point I'm making is the deeper you go in the structure of natural law, the less material, the less inert, the less dead the universe is – the more alive, the more conscious the universe becomes. Then when you get to the foundation of the universe – the Unified Field or Superstring Field – it's simply a field of pure intelligence. 'Intelligence' because it's the fountainhead of all the laws of nature. All the fundamental forces, all the fundamental particles, all the laws governing life at every level of the universe have their unified source in the Unified Field.

"That makes the Unified Field the most concentrated field of intelligence in nature – non-material, dynamic intelligence. Those are the properties of the Unified Field.

"So, as you said, the tighter physics have tried to grasp on to physical reality, to understand what it's really made of – what are the core building blocks of life – at the basis of it all, life – the universe – slips through your fingers, and you come up with something that's increasingly abstract, and increasingly abstract, until you come to the realm of pure abstraction. And that's what the Unified Field is – it's pure abstract potential, which rises in waves of vibration to give rise to the particles, the people, everything we see in the vast universe."

So…. The "Field" is a "place" outside of space and time where everything (all possibilities) already exists, but only in "wave" form. This field does not contain particles; it is not matter; it is not part of the physical universe. Instead it is what the entire universe is made from – from these waves of possibilities.

"Physicists give this a name; they call it a 'quantum wave function,' because it seems wavy. However, this wave function isn't just a wave of matter, like an ocean wave or a sound wave or any kind of wave of matter. It's a wave of possibility. It's a kind of 'thought' wave. And because it is a wave of thought, or possibility, or not-matter, it's invisible to us.

"But we can't explain what we DO see as matter in these small corners of space and time unless we picture that these matter particles somehow come out from or emerge from these thought-wave patterns which are invisible to us.

"Quantum mechanics is really the play and display of information, the play and display of potentiality, waves of information, waves of potential electrons – and it's important, the word 'potential.' This isn't the world of electrons; it's the world of 'potential' electrons.

"But you have to ask the question: waves of what, really. What is the Field that is waving? Is it the ocean? No. It's a universal ocean, an ocean of pure potentiality, an

ocean of abstract potential existence. We call it the Unified Field, or Superstring Field. And that's what we're made of."

Fred Alan Wolf said something very important….

"W*e can't explain what we* ***do*** *see as matter… unless we picture that these matter particles somehow come out from or emerge from these thought-wave patterns*."

The problem is that no one can prove that the Field exists. You can't see it; you can't photograph it; you can't measure it; you can't hold it in your hand.

But when quantum physicists assume the Field is there, they can make incredibly accurate mathematical predictions about the physical universe and how it behaves, which they can not do without assuming the Field is there.

Think of it like electricity. You can't see electricity itself; you can only see what electricity produces – the light it makes, and the power, and the other effects we count on every day; and when we see those effects, we know that electricity must exist.

The same thing is true for the Field. Even though we can't prove it exists, nothing makes sense without it in light of the results of the most recent scientific experiments.

Think about taking a radio to a tribe in the Amazon who had never seen one before….

I can imagine that the natives would stare at that little box for a while trying to figure out how the music came out of it. They might even tear it apart looking for very little people inside playing very small instruments. But eventually they would deduce that there must be radio waves in the air that they couldn't see and couldn't prove existed, that this little box could receive and translate into sounds they could hear. That's what we're dealing with when it comes to The Field. We can't see it, we can't prove it, but we know from looking at the effects that The Field must exist.

But how did this "Field" come into being? Who made it? Where did it come from? Why is it there?

Science has no answers for these questions. They only know that The Field must exist. So I will not talk now about how The Field was created, or who might have created it, or how it already contains all possibilities, because I want to stick only to the science right now in this presentation. We will have to leave that discussion for another time.

The next question we CAN ask, though, is:

How is "reality" created from the Field?

Most quantum physicists agree that it is a very similar process to the creation of a hologram. In other words, the Universe we see is a Holographic Universe.

"When we look at some of the modern scientific views of reality that have tried to get down, down, down to the nitty-gritty, we see that at its ultimate level, say in M-theory or String theory, that reality is not solid – it's mostly empty space – and whatever solidity it has seems more to resemble a hologram picture rather than material, harsh, solid reality."

So, to understand the "Holographic Universe," we have to understand what a hologram is and how it is created.

The simple definition, according to Michael Talbot in *The Holographic Universe*, is that a hologram is "a virtual image, an image that appears to be where it is not."

In other words, a hologram is an image that is not real.

The technical definition from the Merriam-Webster Dictionary is that a hologram is "a three-dimensional image reproduced from a [two-dimensional] pattern of interference produced by a split coherent beam of radiation (as a laser)."

Please don't panic... I'm going to explain that technical definition very simply.

Let's look at how a hologram is made.

It is actually a two-step process…. First, we shoot a laser beam out of a laser gun. And then we immediately split that laser beam into two beams. One of the beams – called the Reference Beam – makes its way and eventually hits a sensitive holographic plate or film. This is like the film we used to have in our cameras, before digital photography.

The other half of the laser beam hits an object first – in this case, an apple – and then hits the holographic plate. When these two parts of the original laser beam come back together at the holographic plate, they interfere with each other just like the waves did in our Double Slit experiment, and they form an interference pattern on the holographic plate.

If you look at the holographic plate at this point, you cannot see the apple. All you can see is the interference pattern, which looks like a bunch of waves. This is Step 1 of creating a hologram.

Remember those 3-D pictures that were such a fad in the 1990's, which looked like just a bunch of meaningless waves; but if you re-focused your eyes, an image would pop out for you to see?

So for our hologram, we now need a Step 2 to see the image of the apple. In Step 2 we focus another laser beam on the holographic plate where our apple sits in wave form, and if we get just the right angle, out pops the apple, looking very real and very solid.

"You might wonder what I'm holding in my hands here. It looks like a black picture, but if I shine a light on it at a certain angle, watch what happens...

"Uh huh. It's a picture. It's a hologram. Now this isn't one of those cheapskate holograms. This is the real deal. Watch what happens when I turn it.... we have genuine three-dimensionality there. Okay? There's no denying that. In fact, one of the things that the camera really doesn't pick up is that the image actually comes right out of the picture to human eye. I mean, if I place my finger here, in terms of my depth perception, that's as if I'm touching its nose. And yet I can move that far back into it. There's nothing there, and yet it appears to be that I could literally actually stroke it.

"You know, there's no denying that there's real three-dimensionality there. This is a particularly good one because it's got these big gnashers, and if I try to move it a little closer to get you a real good look inside the mouth here, you can see very, very clearly.... If you look at the teeth in relation to the tongue behind it, there's genuine movement here. You are actually getting to see behind things. Yep.

"So that's the wonders of the hologram. And yet there it is... it's in a completely two-dimensional space. It doesn't really exist even though my eyes tell me that it does exist."

I'd like you to see a few examples of just how far we've come in our holographic technology over the past few years, and how real holograms that we produce today are beginning to look.

The first example is from 2007. It is part of an international conference being held by the company called Cisco. The man on the left is at the conference center in Bangladore, India. The two men on the right are on stage in India as holograms – but they are actually in San Jose, California.

"So at this time I'd like to beam up Marthin De Beer and Chuck Stuckey back from San Jose. Martin, I'm beaming you up now with my spaceship controls... how are you doing? Hey, Chuck, how are you doing?

"Hey John, we're doing great, thank you.

"Hey, John.

"Hey, guys. You know, yesterday, Marthin, you looked a little bit bigger than me. I hope today we're going to play with some sizes and kind of give the audience an idea how we can make variations on that.

"I believe so, John. I'll tell you it's been a long day here in California. You know, we were up here at three a.m. our time – we're still wearing the same shirts – and we had a 5.6 magnitude earthquake about an hour ago, so I'm here to tell you though that everything's fine. We've had no major damage here in San Jose, and as a global company we'll continue to operate.

"Well you know, it's amazing.... we can see each other as though we were playing poker. I can see you sweat a little bit, I can see that you've both shaved since the last time I saw you. But we don't have the sense of smell yet.

"That maybe a good thing, John!"

In *The Holographic Universe*, Michael Talbot said, "It is relatively easy to understand this idea of holism in something that is external to us, like an apple in a hologram. What makes this difficult is that we are not looking at the hologram; we are part of the hologram."

The two men on the right can touch each other, and they look very real to each other. That's because they are part of the hologram. But if the man on the left went over to where the other two men are standing, he could pass his hand through them and feel nothing. That's because he's outside the hologram.

Remember that – it's a very important point.

It was easy to tell who was a hologram and who wasn't in that example from Cisco. But now watch a video produced just 3 years later – an advertisement for something called the DVE Immersion room...

"This is the DVE Immersion Room. It just won the Global Telepresence Videoconferencing Product of the Year Award. And what I'm about to experience, so I've been told, absolutely has to be seen to be believed.

"The DVE Immersion Room takes videoconferencing to a whole new level, and I must say I'm already very impressed with this luxury boardroom environment.

"Hi, Sarah. I'm David, your Immersion Room tour guide.

"This is amazing! You're in 3D. Hi!

"Hi. I'm glad that we could get together this way via Real Telepresence. That's what you're experiencing – Real Telepresence. It's the best way for people to connect around the world, and it's truly a revolutionary way for people to collaborate.

"This is beyond my experience. It looks like you're right here!

"I AM! I'm right here via Real Telepresence. It's over a high bandwidth network connection. Let me show you... This is a nine-foot wide volumetric 3D image that appears over the boardroom table. This will take your presentations to a whole new level. And that's just one example. This is the most realistic telepresence system ever developed. And it's also an advanced simulation environment for business, education, scientific research and defense.

“So where are you exactly?

“Well, I'm in Irvine, California. But anyone can connect in this personal way to anywhere else in the world. I mean, it's virtually limitless. London, New York, Tokyo – you name the city and we can make Telepresence happen there.

“I can easily see leaders of corporations, diplomats, even heads-of-state in the immersion room. It breaks down the barrier of distance like we're all here in the same room.

“Exactly.”

Today holograms are being used in the most creative of ways… in music concerts.

First there was Carrie Underwood as a hologram joining Brad Paisley on stage to do a duet….. (Music video plays)

Then Snoop Dogg and Dr. Dre brought Tupac Shakur back to life via hologram on stage in a concert in Coachella…

“Hey, it's Snoop Dogg, performing with Tupac at Coachella this.... wait a second! Tupac's still alive?

*“Yeh, do you know what the *** this is?*

“Nope. Very confused right now...

“Dr. Dre and Snoop Dogg performed at Coachella last night, with Tupac Shakur...

“What’s up Coachella?”

“But how is this possible? Tupac died in '96. This defies everything we know as human beings.

“It was a hologram of Tupac.

“Okay, yes, it's a hologram. Tupac is still dead. But this was freaking amazing.... behold the resurrection of Tupac...

“He comes like rising up from the bottom of the stage...

“And then you'll never guess what happened...

“No! He's been shot, by a hologram of Biggie! Or they just turned off the hologram machine...

"It was so cool...

"It was very cool..."

Apparently plans are in the works to do the same with Elvis (although he never really died, of course)...

And now they're talking about bringing Marilyn Monroe back for a "live" concert via hologram!

Michael Talbot said, "Creating the illusion that things are located where they are NOT is the quintessential feature of a hologram….If you look at a hologram, it seems to have extension in space, but if you pass your hand through it, you will find there is nothing there.... Despite what your senses tell you, no instrument will pick up any energy or substance where the hologram appears to be hovering. This is because a hologram is a virtual image, an image that appears to be where it is not…"

So here's the point…

Many highly respected quantum physicists are telling us, based on the latest research, that we are living in a hologram – that our reality is a virtual image, an illusion, that it isn't real.

University of London physicist David Bohm, for example, believes... "that despite its apparent solidity, the universe is at heart a phantasm – a gigantic and splendidly detailed hologram."

Dr. Jacob D. Bekenstein, Professor of Theoretical Physics at the Hebrew University of Jerusalem, said, "An astonishing theory called the holographic principle holds that the universe is like a hologram.... The physics of black holes – immensely dense concentrations of mass – provides a hint that the principle might be true."

There is a famous TV program on the Discovery Channel called *Nova*, and in November of 2011 they broadcast a show called "The Fabric of the Cosmos: What is Space." It was hosted by Brian Greene, theoretical physicist and professor of physics at Columbia University, who wrote the book called *The Fabric of the Cosmos.*

Here is a 5-minute video clip from that program….

"As we examine the fabric of the cosmos ever more closely, we may well find far more surprises than anyone ever imagined.

"Take me, for example. I seem real enough. Don't I?

"Well, yes. But surprising new clues are emerging that everything – you and I, and even space itself – may actually be a kind of hologram. That is, everything we see and

experience – everything we call our familiar three-dimensional reality – may be a projection of information that's stored on a thin, distant two-dimensional surface, sort of the way the information for this hologram is stored on this thin piece of plastic.

"Now, holograms are something we're all familiar with, from the security symbol you find on most credit cards. But the universe as a hologram? That's one of the most drastic revisions to our picture of space and reality ever proposed. And the evidence for it comes from some of the strangest realms of space: black holes.

"This is a real disconnect, and it's very hard to get your head around. Modern ideas coming from black holes tell us that reality is two-dimensional, that the three-dimensional world – the full-bodied three-dimensional world – is a kind of image of a hologram on the boundary of the region of space.

"This is a very strange thing! When I was a younger physicist, I would have thought any physicist who said that was absolutely crazy.

"Here's a way to think about this... imagine I took my wallet and threw it into a black hole. What would happen? We used to think that since nothing – not even light – can escape the immense gravity of a black hole, my wallet would be lost forever. But it now seems that may not be the whole story.

"Recently, scientists exploring the math describing black holes made a curious discovery. Even as my wallet disappears into the black hole, a copy of all the information it contains seems to get smeared out and stored on the surface of the black hole, much the same way that information is stored in a computer.

"So in the end, my wallet exists in two places. There's a three-dimensional version that's lost forever inside the black hole, and a two-dimensional version that remains on the surface as information.

"The information content of all the stuff that fell into that black hole can be expressed entirely in terms of just the outside of the black hole. The idea then is that you can capture what's going on inside the black hole by referring only to the outside.

"And in theory, I could use the information on the outside of the black hole to reconstruct my wallet. And here's the truly mind-blowing part...

"Space within a black hole plays by the same rules as space outside a black hole, or anywhere else. So if an object inside a black hole can be described by information on the black hole's surface, then it might be that everything in the universe – from galaxies and stars, to you and me, even space itself – is just a projection of information stored on some distant two-dimensional surface that surrounds us.

"In other words, what we experience as reality may be something like a hologram.

"Is the three-dimensional world an illusion in the same sense that a hologram is an illusion? Perhaps. I think...I'm inclined to think Yes, that the three-dimensioanl world is a kind of illusion, and that the ultimate precise reality is the two-dimensional reality at the surface of the universe.

"This idea is so new that physicists are still struggling to understand it. But if it's right, just as Newton and Einstein completely changed our picture of space, we may be on the verge of an even more dramatic revolution."

And listen to Leonard Susskind, Professor of Theoretical Physics at Stanford University….

"But there's a quote that I like…. there's a quote that I like very much that comes from a famous intellectual by the name of Sherlock Holmes, and it says, 'when you have eliminated all that is impossible' – which, by the way, sometimes takes five years – 'when you have eliminated all that is impossible, whatever remains must be the truth, no matter how improbable.'

"The thing I am going to tell you tonight is one of those things which seems nutty, It seems wildly improbable. But it wasn't just something that some of us – I wasn't alone in saying this – that some of us just said one day, "Oh, maybe the world is a hologram." That's not the way it happened. The way it happened was exactly this way: when you eliminate everything that's impossible, whatever is left over must be the truth.

"So let me tell you a little bit about where we're going. Good. Okay. What is this thing which Sherlock Holmes might have eventually concluded after trying everything else? And the answer is that in a certain sense, in a certain peculiar sense, the world is a hologram.

"Now not everybody knows what a hologram is here. You know you've all seen these pictures which look three dimensional. They're made out of a film which is a flat piece of film. Nevertheless they look fully three dimensional. I'll tell you eventually what a hologram is. But the idea that the world is a hologram is a wild idea, or at least a seemingly wild idea.

"That is what we now believe, and there's an enormous amount of very very sharp mathematical evidence for this picture. It's not something that was just made up for fun... 'Oh, the world is a hologram, or a black hole is a hologram.' There is very sharp mathematics to it. I'm not going to do the sharp mathematics.

"This is the Universe. Or at least this is somebody's representation of the Universe. And what I'm going to tell you next is it's not just black holes which are holograms. But in a certain sense the entire universe can be represented as a hologram, or any finite region of the Universe, any big chunk of the Universe can be represented as a hologram."

So now let's come back to that press release we started with.... Scientific Evidence that the Entire Universe is a Holographic Projection around the Earth.

Here's what it said, specifically...

"German scientists have been trying to understand why their equipment that measures gravitational waves has been picking up a particular sound. One possible answer that they've come up with is that the entire universe is a holographic illusion.

"For many months, the GEO600 team-members had been scratching their heads over inexplicable noise that is plaguing their giant detector. Then, out of the blue, a researcher approached them with an explanation. In fact, he had even predicted the noise before he knew they were detecting it.

"According to Craig Hogan, a physicist at the Fermilab particle physics lab in Batavia, Illinois, GEO600 has stumbled upon the fundamental limit of space-time – the point where space-time stops behaving like the smooth continuum Einstein described and instead dissolves into 'grains,' just as a newspaper photograph dissolves into dots as you zoom in.

"'It looks like GEO600 is being buffeted by the microscopic quantum convulsions of space-time,' says Hogan.

"If this doesn't blow your socks off, then Hogan, who has just been appointed director of Fermilab's Center for Particle Astrophysics, has an even bigger shock in store: 'If the GEO600 result is what I suspect it is, then we are all living in a giant cosmic hologram.'

"The idea that we live in a hologram probably sounds absurd, but it is a natural extension of our best understanding of black holes, and something with a pretty firm theoretical footing. It has also been surprisingly helpful for physicists wrestling with theories of how the universe works at its most fundamental level."

So we're going to end Part One of this workshop with two last examples of holograms that demonstrate how we could have been living in a hologram all along and not been aware of it….

The first example is from the movie, *The Thirteenth Floor*… Here's the set-up...

A German scientist has built a machine that creates a hologram that a human being can go into and be part of. So far, he is the only one who has actually gone into the hologram. But he gets killed, and his partner and friend – named Douglas Hall – wants to find out who killed him. The scientist left a clue to his murder inside a hologram of Los Angeles, California in 1937. So Douglas Hall is going into the hologram for the first time to try to find the clue....

Pay particular attention to Douglas Hall's reaction when he realizes he's inside the hologram for the first time.

"Set the timer for 120 minutes…."

"I'll set it for 60. It's better."

"120 minutes, Whit."

"60 is safer…. I'm setting it at 60."

"Whit, 1 – 2 – 0."

"120 minutes. Engage timer…. Preparing user for download into simulation…. Program link ready for download…. Transference beginning, download complete…."

"…and 5 cents…."

"'scuse me?"

"You owe me 12 dollars and 5 cents….. Listen young man, I do not have all day…."

"Ferguson, anything wrong?... John, are you okay?.... Terribly sorry, ma'am. Someone will be right with you."

"Oh, my god…."

"John?"

"Yeh?"

"Cigarette?"

"No, thanks. Don't smoke."

"Since when?... Listen, John, why don't you…. why don't you break for lunch. Get some fresh air. You look terrible."

"I think I look pretty good."

"Extra, extra, zeppelin blast killed 35…."

Let me remind you of what Michael Talbot said, "It is relatively easy to understand this idea of holism in something that is external to us, like an apple in a hologram. What makes this difficult is that we are not looking at the hologram; we are part of the hologram."

Maybe you recognize this... The last example of a hologram comes from the TV series, *Star Trek, the Next Generation*. If you're not a trekkie, the starship Enterprise traveled around the universe 24/7/365. So there was no time or place for the crew to take a break or a vacation. Instead they had something on board called the Holodeck, where any hologram could be created for you to enjoy in your free time. In this episode, Commander Riker is testing out some new improvements to the Holodeck and wants to play some jazz in New Orleans....

"Computer, I'd like someplace to play some music.... a little atmosphere..."

"Specify..."

"Jazz."

"Era?"

"Circa 1958."

"Location?"

"Kansas City.... no. New Orleans. Bourbon Street Bar, New Orleans. Around 2 AM."

"Program complete. Enter when ready."

"Very good. Very good indeed. Now I'll need someone to play with.... a trio... piano bass and drums.... and a 'bone for me. Now an audience. Whoa... too many. I was thinking of something a little more intimate. Great job, boys. But computer, blondes and jazz seldom go together. Now that is truly exceptional... but more sultry. Gentlemen, if this is what you call "enhancement," you've got a gift for understatement…. "What's your name? Tell me you love jazz...

"My name is Minuet, and I love all jazz except Dixieland."

"Why not Dixieland?"

"You can't dance to it."

"My girl…. What's a knock-out like you doing in a computer-generated gin joint like this?"

"Waiting for you."

"Waiting for me? You can't be serious."

"Oh, yes, Will. I've never been more serious in my life."

"I'm going to have to leave for a while to see to my duties."

"Your work's very important to you...."

"It is me. It's what I am."

"Can we dance once before you leave?"

"Sure, why not... How did learn to dance so well?"

"From following you. I can anticipate your lead. So... tell me about your work. What is it about it that consumes and enthralls you?"

"What an interesting choice of words.... that's exactly what it does."

"You're very fortunate...."

"I know that..."

"...to be exactly where you want to be, and that's great that you realize it."

"I'd be a fool not to realize how lucky I am, to be on this ship, serving with these people. It's like a dream come true... just like this."

"A dream? Is that what this is? Is that what I am?"

"I know you're a computer-generated image, but... your smell, your touch, the way you feel, even the things you say and think seem so real."

"Thank you."

"How far can this relationship go? I mean, how real are you?"

"As real as you need me to be."

The conclusion to Part 1 of this workshop is that quantum physics is very clear: What we call "reality" is actually a holographic picture that only looks and feels real to us inside it.

Now maybe this will have more meaning for you...

"This is the only radical thinking that you need to do. But it is so radical, it's so difficult, because our tendency is that the world is already 'out there,' independent of my experience. It is not. Quantum physics has been so clear about it…"

One last quote from Michael Talbot in *The Holographic Universe*, "There is evidence to suggest that our world and everything in it – from snowflakes to maple trees to falling stars and spinning electrons – are only ghostly images, projections from a level of reality so beyond our own that it is literally beyond both space and time."

"If you want to see fear in a quantum physicist's eyes, just mention the words: the 'measurement problem.'

"The 'measurement problem' is this.... an atom only appears in a particular place if you measure it. In other words, an atom is spread out all over the place until a conscious observer decides to look at it. So the act of measurement – or observation – creates the entire universe.

"Millions upon millions of globs of energy and light – photons and electrons – they make up this imaginary three-dimensional solid world, which doesn't exist at all according to relativity or quantum mechanics."

I hope now you can see how this idea that we live in a holographic universe is like learning that the Earth is round and not flat. It is going to change everything we think and believe.

So if all of this is true, and quantum physics says it is, the next logical question is:

So what? So what if the world we see is a hologram? What are the consequences of this? And how does this affect my daily life?

I can give you a one word answer right now: Profoundly!

But we're going to take a closer look at the answers to those questions in the next four parts of this workshop series.

Your "homework" – what I want you to do in preparation to watch Part Two of this workshop series – is to…

First watch the entire movie called *The Thirteen Floor.*

And then…

Practice seeing the world around you as a hologram that isn't real. (It often helps to look at everything around you as a movie set, with you as an actor in the movie.)

In Part Two we'll continue our look at the Holographic Universe with the question:

Exactly how is this holographic universe created for us to experience as physical "reality"?

Once you have done your homework, please visit

www.holographicuniverseworkshops.com

for more information about continuing with Part Two of this workshop series.

In the meantime you can download my free ebook, *Butterflies Are Free To Fly: A New and Radical Approach to Spiritual Evolution* by visiting www.butterfliesfree.com