

The Man Who Would Travel Time

*“Whatever we can imagine,
I believe we can create.”*



US scientist seeks to make time travel a reality

By Guy P. Harrison

First of all, let's get one thing straight. Time travel is not exclusive to science fiction. It is real. Scientists have proven it. The catch is that it's only known to work in one direction—into the future.

Here's how it is done: The faster you move, the more time slows down for you. For example, imagine you traveled in space at an extremely fast speed for one year. When you returned to the Earth you would discover that everyone and everything had aged more than you had. The age difference would depend upon how fast you had traveled while you were gone. This effect was predicted by Einstein and has been proven with very precise atomic clocks in high-speed jets. But, if you were able to successfully transport yourself into the future, you likely would be stuck there. Time travel to the past is far more complicated and may be impossible.

University of Connecticut professor Ronald Mallett and his colleagues are not deterred, however. They think that time travel is not only possible but within their reach, not for humans anytime soon but time travel to the past nonetheless. Their work focuses on Einstein's discovery that gravity also affects time. Light can create a gravitational field, Mallett says, therefore, light can affect time. Mallett says he and his team will soon conduct an experiment that will attempt to "twist space and time". If that works, they will send a subatomic particle backward in time and then compare it with an identical particle that did not make the same journey.

It is important to note that Mallett is a legitimate scientist doing legitimate science. He publishes his results in peer-reviewed journals. He is not touching upon magic or any other paranormal claims to frame his work. If Mallett succeeds and creates his miniature time machine, then hold on to your hat. We will have arrived upon a new era of science, as exciting and irresistible as it would be difficult to comprehend.

Guy P. Harrison: Is your work based on the laws of physics? You are not stepping beyond acceptable scientific methods are you?
Dr. Ronald Mallett: I base my work on the fact that light generates a gravitational field just like matter. According to Einstein's Theory of General Relativity time can be effected by gravity. The same force that pulls on us can also effect the rate at which time flows. If a clock was close to Jupiter [with its tremendous gravity] it would slow down even more and so too would our metabolism if we were there. One would age less in a strong gravitational field than another person in a weaker gravitational field.

I have shown that if you have a circulating beam of light, and you can create one with a series of mirrors, this loop of light will cause a gravitational field. The other aspect of Einstein's theory that is necessary to understand is that gravitational forces create curved space.

Describe this.

Think of space as a trampoline and place a bowling ball on the trampoline. The bowling ball will cause the rubber sheet of the trampoline to bend. Now imagine that you put a little marble on the trampoline. The marble will roll toward the bowling ball. Now if you imagine the trampoline as empty space it would appear to you that the marble is somehow being attracted toward the bowling ball. But what is really happening is that the bowling ball is pushing down the rubber sheet.

That's what gravity is, according to Einstein. It's the bending of space. What we call gravitational force is really the bending of space. This was Einstein's major discovery.

How does this relate to time travel specifically?

This is important to my work because a circulating light beam can cause a twisting of space. I predict that a circulating beam of light will cause a twisting of space and anything that is sitting in that will get twisted around too. In particular I say that if you put a sub-atomic particle like a neutron into empty space, and create a circulating light beam around it, it will cause a stirring of space and cause that neutron to move around. Now, in addition to space, Einstein says that time gets distorted as well.



My theory is that the circulating beam of light will twist space and it will twist time. This will create a vortex in space and create loops of time. And it is these loops of time that will allow us to travel back in time.

Describe how twisting space and time might allow you to send something back in time.

Normally we think of time as something that moves along in a straight line. Imagine a strip of paper. At the bottom of the paper you have the past, in the middle the present and at the top the future. This is how we normally live our time line. Now imagine if you twisted this line into a loop and pasted the top onto the bottom. The points of past, present and future are still there but now they are in a loop and I can go from the future into the past.

How will you test this? How will you know if it works?

The first experiment that I and my colleagues at the University of Connecticut are going to look at is to observe a circle of light to see if it causes a

twisting of space by placing a subatomic particle in it and seeing if that particle gets twisted around. The next stage would be to go to higher energy and see if it caused loops in time to occur. We can identify time travel by sending two radioactive particles with identical rates of decay on different paths and then comparing them. That would give you a precise signature.

You have to understand that I am talking about sending a subatomic particle back into the past. I'm not sending a person. But that's OK, because if you can do it at the subatomic level then that means you can scale it up with sufficient money and energy. Creating those closed loops in time would allow a human to travel into the past.

So, if successful, do you believe that your experiments might be the first steps toward developing the ability to send humans back in time?

Yes, exactly right. This could be the prototype of what would become a time machine.

What about using wormholes for time travel? Is the energy required too great?

I think the wormhole idea is a really good one. But the problem is controllability. First you have to find them. Then you have to scale them up so you can use them. In principle it could work, but the problem of finding them and controlling them is tremendous.

Has work on time travel become respectable in physics now?

Yes, it has become a serious area of interest now.

Stephen Hawking says we don't see tourists from the future so therefore time travel is probably impossible.

One has to realize that a real time machine's effect only occurs when it is turned on. This was brought up years ago by Carl Sagan. One cannot travel to a past beyond when the time machine existed. This is reasonable because the machine creates the conditions for time travel. The answer to that challenge is that we aren't inundated with time travelers presently because the first time machine hasn't been built yet.

Do you have any concerns about our species having the maturity to utilize time travel responsibly?

That's a good question. It always arises with new technology. There will have to be regulation. We can't just allow it to just develop with control any more than we can genetic or atomic research. Ultimately there will be "time cops". I do believe, however, that just because we have to be careful does not mean we shouldn't explore this.

What drew you to time travel?

I was drawn to this idea of time travel because of something that happened back in my childhood. My father died of a heart attack when he was 33 years old. I was ten years old and it was a major blow to me. I cared very deeply about him and it turned my world upside down.

Some months later I came across H. G. Wells' book *The Time Machine*. When I read it I thought, "Oh, what if I could build a time machine, go back into the past and warn him. Maybe I could save him." It became my goal to do that. I kept this a secret all through school.

Even though the areas I have studied have been exotic, most of my publishing has been on black holes and cosmology, time travel has always been in the background. It turns out, however, that more and more physicists are studying time travel seriously. I think it's because we all grew up in the *Star Trek* generation. It is wonderful to live in a time when serious physics can be done to look at the possibility of time travel.

You mentioned H. G. Wells and *Star Trek* as influences in your life. Science fiction is something more than mere entertainment isn't it?

Yes. It stimulates us. All you have to do is think about the work of Jules Verne with rocketry and how it inspired the kids at the beginning of the 20th century. Many scientists are stimulated by what they read in science fiction. It's extremely important. Whatever we can imagine, I believe we can create.

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