

# How to Time Travel

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Time travel fantasies are as popular as ice cream in summer. As with ice cream, these fantasies come in different flavors. This time travel essay will not promote previous error. Nevertheless, there are ways we can all “time travel,” which is revealed below.

The speed of light in a vacuum is both a gateway and a barrier to physical time travel. The speed of light is an “absolute limit” *only* because nothing else we know of can *accelerate nearly instantaneously* to such speed.<sup>1</sup> To fly faster than photons relative to a common space-time frame we would need to *more slowly accelerate for some time directly away to a terminal speed that is eventually faster than the initial one-pop speed of light relative to our initial frame of reference.*

Such an achievement would be an unsatisfactory type of time travel, in that we would be flying away from home base, even if we could eventually catch up with some “historical” photons that were launched just before our journey began.

If we were to travel between stars in a space ship, continually accelerating, and later decelerating at “one g” (equal to Earth’s gravity) – we could first accelerate to beyond the single-pop speed of photons whose launch time frames are the same as our craft’s original launch time frame. Each moment of our craft’s acceleration has its own new frame of reference. A sufficient accumulation of these new moments allows for hyperluminal speed relative to the initial frame of reference on Earth.

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<sup>1</sup> <http://astronomy-links.net/LightSpeed.pdf>

Deceleration toward the target at one g would negate the achieved hyperluminal effect.<sup>2</sup>

In other words, our ship over an interstellar journey can be slower, and faster, and then slower than individual photons, depending on the relationship among vector time frames.

So far, no form of linear rocket propulsion is available for such an extended trip – and *we are still stuck without personal time travel on Earth* within what is our original frame of reference.

If theoretical astrophysics as a profession is anything, it is characterized by fascination with the psychological power of ideal tautological math to overcome clear logic and common sense.<sup>3,4</sup> For example, in fashion is the bizarre idea of our visible universe being a hologram within curved space, somewhat like the images inside Plato's cave.<sup>5</sup>

A few years older is the General Relativity-inspired idea of a zero-dimensional singularity at the center of black holes, where space turns into zero, AND where it is possible to have awesome wormholes.<sup>6</sup> The likes of Stephen Hawking<sup>7</sup> and many science fiction authors have profitably employed wormhole fantasies.

The recent movie, *Interstellar*, did an excellent job of presenting the idea of human wormhole travel. However, interdimensional wormholes through which we humans can safely fly inside spacecraft without spaghettification do not exist.

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<sup>2</sup> <https://en.wikipedia.org/wiki/Acceleration>

<sup>3</sup> <http://astronomy-links.net/correlation.and.causation.pdf>

<sup>4</sup> <http://astronomy-links.net/AstrophysicsCloudCastles.pdf>

<sup>5</sup> <http://astronomy-links.net/Holograms.html>

<sup>6</sup> <http://astronomy-links.net/Gravities,BlackHoles,BigBangs.pdf>

<sup>7</sup> <http://astronomy-links.net/hawkingerrors.html>

We can *mathematically imagine* dimensional travel along the lines of string theory and supersymmetry. No test has ever proven string theory's eleven dimensions; and superpartners in string theory are not yet demonstrated, despite Large Hadron Collider experiments.<sup>8</sup> The four intellectually boring dimensions of space and time in the Standard Model seem to survive all exotic experiments. Therefore, park your cool *Dr. Who* Tardis in the fun house of your mind.

## **Real Time Travel**

Having dispensed with fake time travel, let us now turn to what I call real time travel. We are already doing this in a way, and it does not require imaginary membrane or brane<sup>9</sup> structures.

One of the reasons I enjoy *astronomy* is because it allows us to *look back into universal time* from our Earth's frame of reference. We are flooded nonstop with photons arriving along all three dimensional directions from as far back as nearly the start of our Big Bang, beginning with the Cosmic Microwave Background.

The glorious history of our own visible universe is there for all to enjoy – either as objects nearby with the naked eye, or also with increasingly sophisticated instrumental eyes. Since photons in space move within this virtual vacuum at light speed, we can calculate distance as a function of the travel time it takes Doppler redshifted photon *waves* from different light sources to reach us. For example, it takes light only eight minutes to reach us from the nearest star, but more than ten billion light years from stars near the edge of our universal visual bubble. That is real “time travel” observing to us, while we stay safely at home within our shared Earth frame of reference.

Other hard sciences offer windows into past times, such as *archeology, geology, and anthropology*. The recent emergence of

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<sup>8</sup> <http://astronomy-links.net/supersymmetry.htm>

<sup>9</sup> <http://astronomy-links.net/ethers.html>

*gene science* has allowed us to historically trace our various group ethnicities – and even to suggest how all life in this planet’s biosphere appears to be genetically related. Here is deep time travel within our shared terrestrial frame, but not among photon time travel frames of reference.

How can we as individuals achieve *personal time travel* within our own life stories, both past and future?...

Many of us sometimes play what-if mental games about how our lives could have been different, *if only* events earlier in our lives had gone another way. This game, if real, would have both intellectual opportunity and danger:

There is a philosophical cliché about how the lonely death of a butterfly on one side of the Earth affects what occurs later on the other side of the biosphere.<sup>10</sup> Taken literally, this “butterfly effect” is cause-and-effect carried to absurdity. We might as well further calculate that we have molecules and atoms inside our bodies that once passed through the bodies of famous ancestors, and deeper in time through extinct species. There is evidence that we all are partially made of atoms from supernovae. It could even be argued that our visible universe is similar to, and part of, the neighborhood multiverse.<sup>11</sup>

Whereas all of this cosmic fraternity of being is time related, and is somehow collectively caused, none of this perpetual maelstrom offers support for the individual butterfly causal thesis. The level of causal difference is due to the systemic *elasticity* of yin/yang physical interactions, both near and far, and to the presence of *quantum randomness* above and below the quantum dimensions. Energy dissipates and mutually interpenetrates. Local *event vibrations* mutually dissolve into new dialectics over space and time. Simultaneously we can love our butterflies, and

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<sup>10</sup> [https://en.wikipedia.org/wiki/Butterfly\\_effect](https://en.wikipedia.org/wiki/Butterfly_effect)

<sup>11</sup> <http://astronomy-links.net/Antimatter.pdf>

maybe love them even more for their unique beauty inside our time and local space.

On a human physical and temporal scale it makes some sense to think roughly along the butterfly causal thesis, but not with butterflies. Humans are closely bound among the generations, unlike random generations of generic insects. Therefore, we can imagine what-if scenarios regarding past personal histories.

If we could “go back in personal time” locally (which we can’t), we could view our junior selves and the families of our origins. If we could selectively influence things back then from today’s perspective, either as beings they could see or as invisible ghosts, then there are two weird possibilities:

First, going back to our grandparents’ generation we could do or say something that might lead to our parents never meeting, which would void our current existence! Second, we could surreptitiously tinker around the social edges, leading to minor changes that could maybe benefit us today.

The vast tapestry of human life is why I have seriously studied *human history*. The 20th century philosopher George Santayana famously said:<sup>12</sup> “Those who cannot remember the past are condemned to repeat it.” We could also say that if Gen. Robert E. Lee had read and heeded lessons from Sun Tzu’s *Art of War*,<sup>13</sup> the South could have won at Gettysburg, and maybe the Civil War itself, with very serious consequences for today.

History has another time travel value: *projecting the future*. Futurists of all stripes use the historical past as springboards for envisioning the future. This is a type of as-if, forward time travel. Nothing physical or functional comes from a vacuum. Whereas the past is essentially frozen, the individual and social future is up for grabs.

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<sup>12</sup> [https://en.wikipedia.org/wiki/George\\_Santayana](https://en.wikipedia.org/wiki/George_Santayana)

<sup>13</sup> [https://en.wikipedia.org/wiki/The\\_Art\\_of\\_War](https://en.wikipedia.org/wiki/The_Art_of_War)

Pure determinists and fatalists would argue with this “up for grabs” thesis, and they have a point. However, determinism for humans merely describes the past’s influence on us, not fully formed destiny. Fatalism is either a synonym or an idea less defensible. We are the only historical species on Earth somewhat creating our own histories. Even astrologers talk only about the *influence* of what they measure on our life path.

Humans and emergent AI comphumans will have increasing freedom to modify much of that deterministic debris. Even our genes are now modifiable, and comphumans will be free of genes.<sup>14</sup> We are entering the *Anthropocene* geological time period – the first time that one species on this planet has so profoundly shaped (somewhat unknowingly) the environmental future, both for good and bad.

“Time travel” is or is not valid, depending on our perspective, history, and understanding of physics. It is just fine to imagine different elements of the past, and optional futures. But no, we will never travel in vessels through interdimensional wormholes within eleven-dimensional spacetime. The worm holes of our existence are places where we find fishing bait.

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<sup>14</sup> <http://astronomy-links.net/AI.and.HI.pdf>