

Response to Camille Carlisle about *The Principle*

- Camille Carlisle is the Science Editor of *Sky & Telescope Magazine*
- Response by Robert Sungenis, Executive Producer of *The Principle*, and author of the series *Galileo Was Wrong: The Church Was Right*

NB: Robert Sungenis' critique of Ms. Carlisle's review has been requested to be posted at the Catholic blog site: <http://truthandcharity.net/protecting-faith-from-pseudoscience-a-review-of-the-principle/#comment-10281>, since this site is where Ms. Carlisle posted her review

Camille Carlisle: I was recently asked to review a [new movie called *The Principle*](#), being released this month. The film, produced by Catholic theologian Robert Sungenis, uses science to raise the specter of geocentrism — the theory that Earth is at the physical center of the universe. With breathtaking cinematography and intellectual one-two punches, it paints a compelling argument that geocentrism might be right and the world's scientists are willfully blind to the evidence.

Compelling, that is, if you know nothing about astrophysics.

If you do, you'll soon see that the movie is a combination of science, bogus science, and conspiracy theory, tied up in a Gordian knot that would take much more than a blog to fully unravel.

The reason I'm writing about it in a Catholic blog is this: the movie has the potential to erode the scientific literacy of believers and convince nonbelievers that science and Christianity don't mix. No doubt the movie's creators are well intentioned. But good intentions make hell-bound paving stones. This isn't me, a science journalist, merely ranting about the movie's deplorable lack of fact-checking. This is me, a Catholic, worried about the error it will seed in the minds of God's little ones.

Because in watching the movie and having a dozen pages of e-mail back-and-forth with the producer and publicist, one thing became clear: the movie's creators do not understand physics.

Let's take their argument about center of mass as an example. The movie correctly says that, according to Newtonian gravity, bodies in the solar system orbit around their common center of mass. What that means is that, technically speaking, Earth and the planets don't orbit the Sun; rather, the Sun and planets orbit their common center of mass.

But the movie then tries to make the argument that, if Earth sits at the universe's center of mass, then it wouldn't move and *everything* — Sun, stars, our Milky Way galaxy, the cosmic web of galaxies and galaxy clusters we see in the universe — would rotate around that fixed point. In other words, Earth is stationary in a giant, rotating celestial sphere.

However, gravitationally, that just doesn't work. First of all, the Sun has 99% of the solar system's mass, and so the center of mass for our planetary system lies *inside* the Sun.

R. Sungeis: Yes, the center of mass for the planetary system lies inside the Sun, but if the Earth is the center of mass for the universe, and the universe daily carries the Sun around the Earth, then the Earth is not in the "planetary system."

C. Carlisle: Second, there's no gravitational reason that Earth would sit still where it is. For example, Earth can't be as close as it is to the Sun and *not* feel our star's gravitational influence. Earth is made of matter: it has mass. It's also a mere 93 million miles from the Sun — astronomically speaking, right on top of it. And the Sun is roughly 300,000 times more massive than Earth. Therefore, even *if* Earth were at the universe's center, our planet would still not evade the Sun's pull. Why? Because the closer two objects are to each other, the stronger the gravitational pull is. And Earth is just too close to the Sun.

R. Sungeis: Yes, the Sun does exhibit a gravitational force, since that is how it keeps the planets in tow, but if the Earth is in the center of the universe, it is not a planet and thus the Newtonian dynamics must be applied differently.

In Newtonian dynamics, since the Sun is revolving around the universe's center of mass (where Earth is positioned in the geocentric system), the Sun will have a centrifugal force acting upon it that keeps it away from the Earth.

The centrifugal force is calculated by the mass of the Sun multiplied by linear speed multiplied by the radius from the center, or Centrifugal Force = mvr or Mw^2r (where w measures angular speed).

The mass of the Sun is 1.98×10^{30} kilograms. The linear speed is 30 kilometers/sec. The radius (which includes both the equatorial radius of the Sun and the Earth) is 1.5×10^8 kilometers.

Hence, the centrifugal force on the Sun is 1.18×10^{34} Newtons.

Conversely, the force of gravity between the Sun and the Earth is measured by Newton's gravitation equation ($F = Gm_1 \times m_2/r^2$). Hence we have $F = m_1 \times m_2/r^2$.

$$F = (6.674 \times 10^{-11} \text{ m}^3 / \text{kg s}^2)(1.9891 \times 10^{30} \text{ kg})(5.9736 \times 10^{24} \text{ kg}) / (1.503 \times 10^{11} \text{ m})^2$$

Hence, the gravitational force = 3.510×10^{22} Newtons

As we can see, the centrifugal force on the revolving Sun is 12 orders of magnitude higher than the centripetal force. So obviously, the gravitational force of the Sun on the Earth is far outweighed by the centrifugal force on the Sun itself, and thus Camille's objection is nullified.

So how does the geocentrist explain the extra 12 orders of magnitude? He does so by saying that the centrifugal force is not on the Sun, but on the Planck medium that constitutes the space that carries the Sun (something Newtonian mechanics never considered but which Quantum Mechanics says exists).

Since Planck particles have dimensions of 10^{-33}cm , 10^{-5}grams , and an overall density of $3.6 \times 10^{93}\text{ grams/cm}^3$, the Planck medium absorbs the tremendous centrifugal forces of a rotating universe, and the celestial bodies (the stars and galaxies) will be kept in tow by the rotating universe.

Modern physics can mount no argument against this since the same principle of centrifugal force at large distance is allowed by Einstein's General Relativity. For example, in a book on General Relativity by William Rosser, he states:

If gravitational fields are present the velocities of either material bodies or of light can assume any numerical value depending on the strength of the gravitational field. If one considers the rotating roundabout as being at rest, the centrifugal gravitational field assumes enormous values at large distances, and it is consistent with the theory of General Relativity for the velocities of distant bodies to exceed 3×10^8 m/sec under these conditions.

Relative to an inertial frame the 'fixed' stars are at rest or moving with uniform velocity. However, relative to a reference frame accelerating relative to an inertial frame the stars are accelerating. It is quite feasible that accelerating masses give different gravitational forces from the gravitational forces due to the same masses when they are moving with uniform velocity. Thus the conditions in an accelerating reference frame are different from the conditions in inertial frames, since the stars are accelerating relative to the accelerating reference frame. It seems plausible to try to interpret inertial forces as gravitational forces due to the accelerations of the stars relative to the reference frame chosen.¹

C. Carlisle: In addition, decades of velocity measurements, radio observations, and many other lines of evidence show that [our solar system sits in the outer-ish part of a spiral galaxy](#) that's rotating around a center that isn't Earth. Observations also show that our galaxy is in a group of galaxies, and that [this Local Group is on the outer edge of a giant supercluster](#). Geocentrism simply doesn't match the empirical evidence. Nor is there any coherent theory of gravity that can both explain all our observations and put Earth at the universe's physical center.

¹ *An Introduction to the Theory of Relativity*, William G. V. Rosser, 1964, p. 460. Einstein was criticized on this very point by Ph. Lenard in a 1917 open debate, later published in 1920. Lenard stated: "superluminal velocities seem really to create a difficulty for the principle of relativity; given that they arise in relation to an arbitrary body, as soon as they are attributed not to the body, but to the whole world, something which the principle of relativity in its simplest and heretofore existing form allows as equivalent" ("Allgemeine Diskussion über Relativitätstheorie," *Physikalische Zeitschrift*, 1920, pp. 666-668, cited in Kostro's *Einstein and the Ether*, p. 87).

R. Sungenis: Not quite. Velocity measurements do not prove anything, since modern cosmology cannot distinguish between whether we are moving toward the object or the object is moving toward us. Hence, these alleged “observations” prove nothing regarding our position in the Milky Way. All pictures of the Milky Way are artists’ conceptions, not real photographs, since there are no cameras in space that can take a picture of the whole Milky Way.

C. Carlisle: There are many other examples in the movie like this one. One that might catch you off guard is the work by astronomer John Hartnett, whose analysis of cosmic structure seems to reveal concentric spheres centered on us. However, as astronomer Tom Bridgman explains in his [several blogs on this subject](#), this is a flaw in Hartnett’s analysis. (Bridgman’s blogs are quite technical — [the man really knows his analytic techniques!](#) — but if you want a hard science analysis I recommend reading his blogs on Hartnett’s work and on *The Principle*.)

R. Sungenis: Camille is only telling half the story. Tom Bridgeman had to apologize to John Hartnett after he accused Hartnett of faulty analysis. This apology is on Bridgman’s blog. If Bridgman took it down, I can show you the apology and what led to it, since I was involved in the exchange between Bridgeman and Hartnett. Moreover, Hartnett is not the only one to see concentric spheres of galaxies around Earth. There are a whole array of observations, not only of galaxies centered on Earth, but also of quasars, gamma ray busters, BL Lacertae, stellar axes, etc.

C. Carlisle: The movie also argues against what it calls “patches,” things such as dark matter and dark energy that, it accuses, astrophysicists invoke to try to “save” their theories. But this is a shortsighted argument: it’s equivalent to saying that, since we don’t know everything about the universe, we don’t know anything. Yet however much distaste you might have for dark energy, [something is making the universe’s expansion speed up](#). “Dark energy” is the filler word for that something, until we figure it out.

R. Sungenis: Camille is proving our point for us. Since she assumes that the only answer to red shift is an expanding universe (as Hubble was the first to do in 1929 in order to escape having the Earth in the center of the universe), then from this unproven supposition she is forced to say that the energy from 1A supernovas requires an acceleration of the expansion. Since quantum mechanics has 10^{120} too much energy for the accelerated expansion, and the material universe has only 4% of what she needs for the acceleration, Camille is forced to make a special pleading to the audience hoping that they will allow her to tout the “dark energy” as existing until she can actually find it. But this is not science. If you can’t find the dark energy, and don’t have a clue what kind of energy it could be, it’s time to go back to the drawing board. When you get there, you will find the geocentrists, since they don’t need any

dark energy for their universe. In fact, even from a Big Bang perspective, a universe without dark energy puts the Earth in a special “central” place in the universe.²

C. Carlisle: *The Principle's* creators really seem to have it in for Einstein. This is a common problem for those not trained in modern physics. Many think that Einstein's theory of gravity (colloquially called general relativity, or just GR) is esoteric nonsense. But if you've ever used GPS, you've used GR. According to GR, Earth creates a gravitational well in the fabric of spacetime. Because of that, time runs slightly slower on Earth than it does for the GPS satellites in orbit. ([The delay is about 38 microseconds per day.](#)) In order to use GPS, we have to account for relativistic effects. A world without GR is a world without Google Maps.

Put that in your pipe and smoke it.

R. Sungenis: Let's look at the real story. The truth is, GPS does not work by General Relativity (GRT). First, the GPS shows that there is a 50 nanosecond difference between EM waves traveling east to west as opposed to west to east, but Einstein's Special theory (SRT) says light speed is always constant. So the GPS nullifies SRT and SRT is never used to explain the GPS. Rather, the non-constant speed of light in the GPS is mitigated by pre-programming the GPS computers with a Sagnac correction, since in 1913, Georges Sagnac found, in the laboratory, that light travels at different speeds going east to west as opposed to west to east).

Second, as Camille invokes GRT to solve the problem that GPS clocks run faster than clocks on Earth, she says the “Earth creates a gravitational well in the fabric of spacetime,” but there is no physical proof for this model. It is simply a mathematical construct. The fact that clocks at higher altitudes run faster could more easily be explained by the fact that the constitution of space is thinner at higher altitudes than on the surface of the Earth, and thus the moving parts of the clock (even cesium clocks) will move faster in a thinner space. It could also be explained by saying that the gravity is greater at lower altitudes, but we don't need GRT to confirm that fact.

As for Camille's complaint that “*The Principle's* creators really seem to have it in for Einstein,” this is simply not true. Einstein stands or falls on his own merit. It is a fact, however, that Einstein invented SRT to answer the 1887 Michelson-Morley experiment – an experiment that showed the Earth wasn't moving through space. Instead of admitting the Earth was motionless, Einstein changed the constitution of space from aether to “spacetime” (and never told us what constitutes “spacetime”). Einstein also explained away the small positive results for the presence of aether found in the Michelson-Morley experiment (about 5% of what was needed if the Earth were revolving around the Sun) by claiming that it was there because of experimental error. But in 1925, Michelson did another

² “Dark Energy: Is it Merely an Illusion?” *ScienceDaily*, Sept. 29, 2008, citing the article by Timothy Clifton, Pedro G. Ferreira, and Kate Land, “Living in a Void: Testing the Copernican Principle with Distant Supernovae,” *Physical Review Letters*, 101, 131302 (2008) DOI: 10.1103/PhysRevLett.101.131302.

experiment that measured for aether and found a 98% presence. Since 98% cannot be “experimental error,” Einstein tried to answer Michelson’s 1925 experiment by using GRT instead of SRT (since the confirmed presence of aether in 1925 nullified SRT). Einstein believed he could use GRT since in GRT he allowed back a form of aether (whereas he allowed no aether in SRT). But since the aether Einstein allowed back for GRT was, according to his own description, “non-ponderable” and “could not be tracked by time,” then it shouldn’t have registered anything in the 1925 Michelson experiment. As such, we see that Einstein’s theories are contradictory.

The utter irony is, as Einstein invented SRT in 1905 so that modern science would have at least some answer to the 1887 Michelson-Morley experiment (which experiment showed the Earth wasn’t moving), since SRT did not include gravity, Einstein was forced to invent GRT in 1915, but GRT allows the Earth to be motionless in the center of the universe and have the whole universe rotate around it, as Einstein himself admitted:

We need not necessarily trace the existence of these centrifugal forces back to an absolute movement of K' [Earth]; we can instead just as well trace them back to the rotational movement of the distant ponderable masses [stars] in relation to K' whereby we treat K' as ‘at rest.’... On the other hand, the following important argument speaks for the relativistic perspective. The centrifugal force that works on a body under given conditions is determined by precisely the same natural constants as the action of a gravitational field on the same body (*i.e.*, its mass), in such a way that we have no means to differentiate a ‘centrifugal field’ from a gravitational field... This quite substantiates the view that we may regard the rotating system K' as at rest and the centrifugal field as a gravitational field... The kinematic equivalence of two coordinate systems, namely, is not restricted to the case in which the two systems, K [the universe] and K' [the Earth] are in uniform relative translational motion. The equivalence exists just as well from the kinematic standpoint when for example the two systems rotate relative to one another.³

C. Carlisle: But my biggest complaint is the movie’s underlying philosophical argument. The movie claims that moving Earth from the physical center of everything implies that “man means nothing,” that if the universe doesn’t revolve around Earth, we aren’t special. This dichotomy is a materialist lie. As Stephen Barr brilliantly lays out in his book *Modern Physics and Ancient Faith*, we need to separate scientific results from the philosophy that uses them to make its case. Too many people buy into the mantra that science disproves faith. Wrong. Materialism uses science to argue that faith isn’t true. We can just as easily do the opposite. (Read Barr’s book for more info.) The movie quotes prominent scientists such as Lawrence Krauss and the deceased Carl Sagan to set up this geocentrism-or-insignificance choice, but both of these men are infamous militant atheists. Of course they’re going to interpret scientific results as proving we aren’t special. The sad thing is, *The Principle* buys into this

³ Einstein’s October 1914 paper titled: “Die formale Grundlage der allgemeinen Relativitätstheorie,” trans. by Carl Hofer, in *Mach’s Principle: From Newton’s Bucket to Quantum Gravity*, eds. Julian Barbour and Herbert Pfister, pp. 69, 71.

dichotomy, too. The question you should ask yourself is, Why? Why does not being in the middle of everything mean we're not special? Who said the two have to go together?

R. Sungenis: We grant that, for the sake of philosophical logic, it shouldn't make any difference to the committed Christian whether Earth is in the center of the universe or not. God could have made any universe He wanted. But that begs the question, because, as we point out in the movie, atheists are much more comfortable with an Earth that is not in the center since it would be more likely that such a non-central position is the product of time and chance. It is time and chance that is the foundation of modern atheistic science. But if the Earth is in the center of the universe, even the most virulent atheist knows that it is highly unlikely that such a unique and favored position could happen by chance. Someone, with a capital S, would have to put the Earth in the center, and a Creator who designs is what the atheist fears most.

C. Carlisle: In fact, salvation history suggests the opposite is true: God picks the least and the lowly. The Jews were a tiny little people among great peoples: "It was not because you are more numerous than all the peoples that the LORD set his heart on you and chose you; for you are really the smallest of all peoples. It was because the LORD loved you and because of his fidelity to the oath he had sworn to your ancestors" (Dt 7: 7-8). Jesus Himself was from a backwater town in Israel. Heck, He picked *fishermen* as apostles. And think of the many saints who were not at the center of anything — the children of Fatima come to mind — yet He chose them. So why on Earth should we expect our planet to be the physical center of the cosmos? Is it not more amazing that we aren't? Doesn't it speak to God's providence and love and tenderness, and the fact that *He's* God and we aren't?

R. Sungenis: Camille's argument is misplaced. If Camille wants to use Scripture to prove the point, well, Scripture is the very source that tells us that the Earth is not moving and that every other celestial body is revolving around it on a daily basis. As such, the Earth must be at or near the center of the universe, since that would be required of the one object that is motionless. Obviously, then, unlike Camille, Scripture sees no conflict between humanity being "lowly" and having the Earth the motionless center of the universe. For Scripture, the motionless Earth is God's fixed footstool (Isaiah 66:1), and a footstool already implies our humble position.

C. Carlisle: Noted cosmologist Max Tegmark raises a useful point in the movie when he says, "We had this arrogance, and we got it knocked out of us. And we realized that we're not the center of everything" — except we haven't had it knocked out of us. Because if we had, we wouldn't sin. Sin is (spiritually) putting ourselves at the center. That the weight of scientific evidence suggests Earth is not at the physical center of the solar system, the galaxy, or the local supercluster of galaxies doesn't tell us anything theologically — 'cause hey, it's only physics, and physics only deals with physical reality, not metaphysics. But it wouldn't hurt us to meditate on the point for a while.

R. Sungenis: Camille's arguments are misplaced and her metaphors are mixed. Sin is not defined as putting ourselves at the center. There is a big difference in being psychologically self-centered (which leads to sin) and having the Earth in the center of the universe as God's footstool. In fact, since Scripture and the tradition of the Catholic Church are adamant that the Earth is motionless at the center of the universe, then the sin would more likely be committed by those who wish to deny that testimony.

October 27, 2014