

The oldest star in the universe? Maybe, maybe not

February 14 2014, by Geraint Lewis



Credit: AI-generated image ([disclaimer](#))

There is a myth that goldfish have a three-second memory, and I sometimes wonder if the same is true about the part of the human mind that deals with science in the news.

This week, the international media has trumpeted the [discovery](#) by

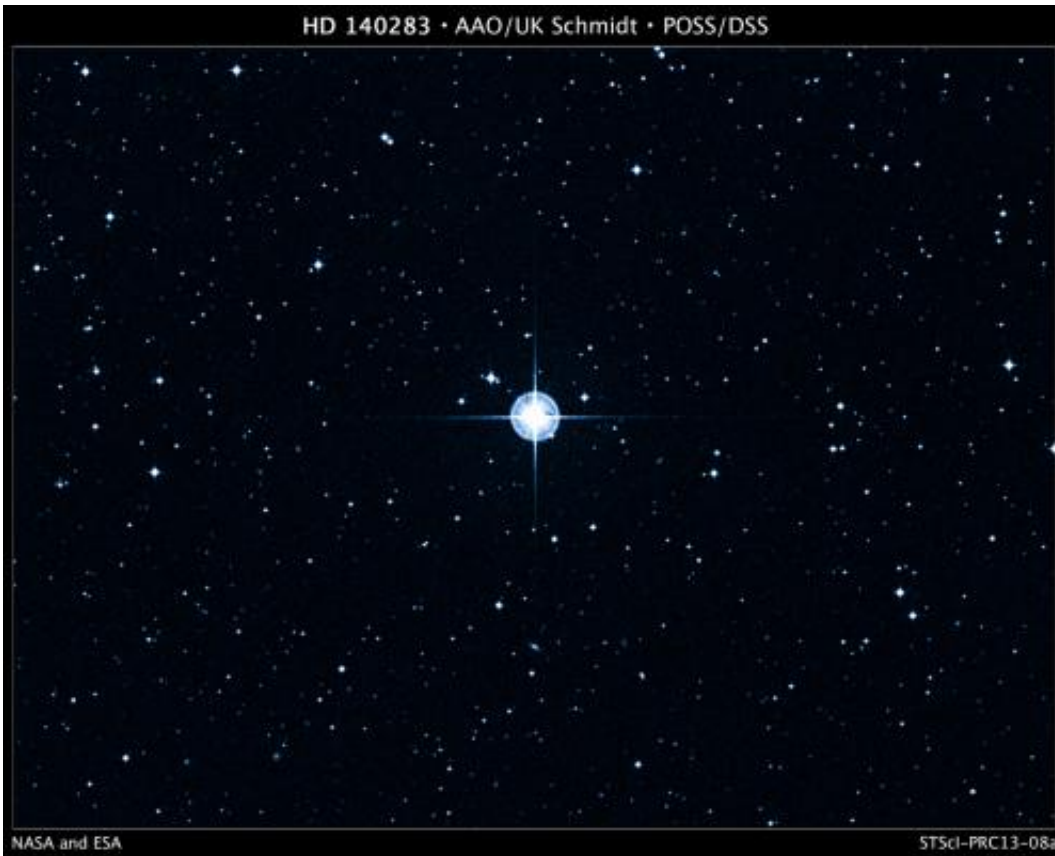
Australian scientists of the [oldest star in the universe](#), with the catchy name SMSS J031300.36-670839.3, formed in the almost pristine gas soon after the Big Bang.

This would mean the star has been slowly burning away for almost 13.7 billion years.

Something older?

But this story may leave those that follow the scientific media scratching their heads slightly, as only six months ago the [media telling](#) us about HD 140283, the "[Methuselah Star](#)", whose best-estimated age is almost 14.5 billion years.

This formally makes HD 140283 [older than the universe](#) itself, but the uncertainty in the age, by about 800,000 years, could bring it back into line with our cosmological measurements for the universe's age.



A Digitized Sky Survey image of the oldest star with a well-determined age in our galaxy, cataloged as HD 140283, which lies 190.1 light-years away. Credit: Digitized Sky Survey (DSS), STScI/AURA, Palomar/Caltech, and UKSTU/AAO

So, why is this new discovery touted as the oldest star in the universe?

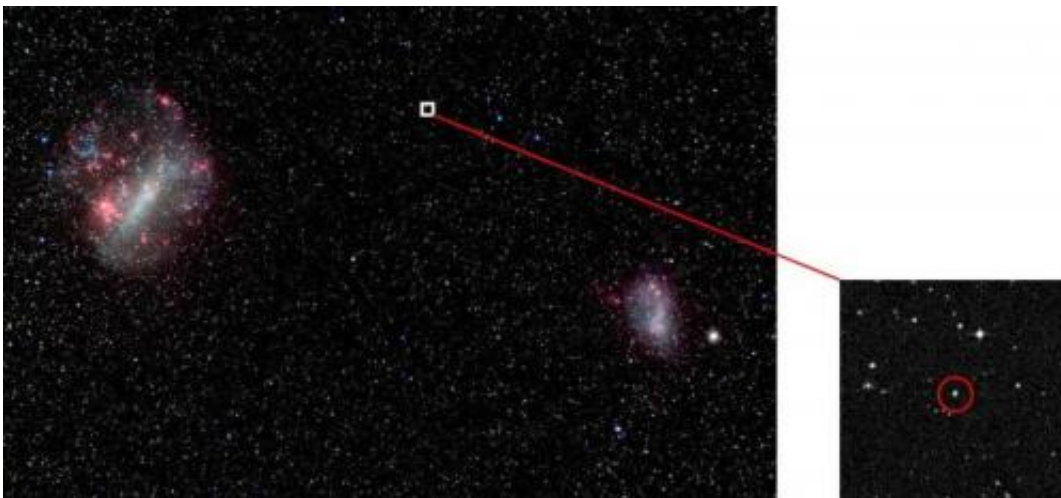
Science vs cultural interest

In my opinion, there are two key reasons, one scientific, the other cultural.

Let's start with scientific. Discovery in [science](#) typically come in two pieces, the experiment or observations, and the interpretation. The media often focus upon the latter, as interpretations can be quite sensational. It

what grabs the headlines, while the blood, sweat and tears shed in experiment and observation to get the data can be messy, or laborious, and could be swept under the carpet.

As explained by Stefan Keller, the observations required to identify this [new star](#) were heroic.



It is in a picturesque part of the southern sky between the Large and Small Magellanic Clouds (two galaxies that orbit around the Milky Way) Credit: Mike Bessell, ANU/Space Telescope Science Institute

A new telescope, SkyMapper, born out of the ashes of the disastrous 2003 Canberra fires, is mapping the Southern sky, looking, at least in part, for stars with the right colours to be missing the [heavier elements](#) we find are common in the Sun.

SkyMapper throws up lots of candidate stars, and spectroscopy with larger telescopes is needed to search for the telltale signs (or lack of) heavier elements.

The [scientific discovery](#) presented in this new result is that they have identified a star that appears to have been forged from almost pure hydrogen and helium, polluted with a small amount of heavier elements from a single exploding star. These conditions were only present in the very early Universe, and so clearly this is an important discovery.

But what about the claim that this is the oldest star in the universe? Well, this is where things get messy. Unfortunately, stars not display simple clocks ticking off the time since they were born.

The age of stars

To understand the age of stars, we have to understand how they are formed, and how they evolve, and while a star is [much simpler than a bumblebee](#), accounting for the complexities of physics, the uncertainties in the conditions in the early Universe, and may other factors, precise dating is fraught with difficulties.

This latest discovery, of SMSS J031300.36-670839.3, may be the oldest star we know in the universe, but given the uncertainties involved, maybe it isn't.

In fact, the *Nature* paper [announcing this new star](#) goes into exquisite detail on how the observations were made and how the abundance of chemicals was measured, and then argues conclusively that the material from which the star was made must have existed in the very early Universe. But it's highly important to note that the one thing the authors do not comment on is the actual age of the star.

Back to cultural interest

So, what about the cultural reasons?

We've established that the discovery of an extraordinary chemically deprived star that could only have formed in the [early universe](#) is a scientifically significant result.

But would there have been much media interest if it was said that it *may be* (not is) the oldest star in the universe?

It appears that to pique the interest of some journalists, stories must be quirky or threaten to "rewrite the textbooks". So out goes the actual uncertainty and confusion that often muddies the waters of real science, and this story is sold as the discovery of the oldest star.

What is a public to make of this latest news when, as I raised earlier, they've already been told of the existence of something older in the Methuselah Star discovery?

In a world where Kim Kardashian doing the [most trivial things](#) appears newsworthy, it seems that science has to be sensational to be considered interesting to the public.

I should make it clear to my colleagues that I am not picking on this particular news story; I have great respect for the astronomers involved, and am very excited by the success of SkyMapper and the discovery of this exotic star.

But we've all become guilty (me included) often learning through media training how you "sell" your story to the media.

This leaves the news reading public, including the next generation of scientists, with a distorted view of how science proceeds and what's important.

While it would take a substantial cultural shift, science needs a better,

more accurate, presentation within the public [media](#), displaying it as a continual human challenge. This is not an unattainable goal!

But before we close, we can return to the question on whether SMSS J031300.36-670839.3 is the oldest star we know in the Universe.

Maybe it is. Maybe it isn't. Nobody knows for certain.

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