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16 Mar 2009

Yavuz is experienced in the fields of physics and electrical engineering. He is fascinated by the idea that our Universe is constantly changing and evolving. He is married and has one son.

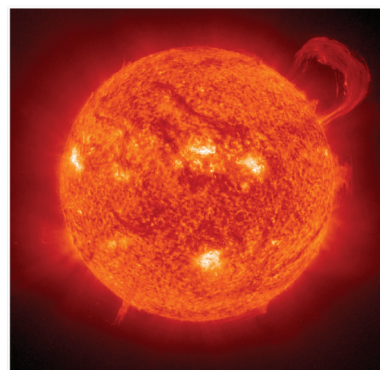
The galaxies, stars, planets and life on our world are stories within stories that are still unfolding. This article highlights the fact that our Universe is far from static, and is in fact changing all the time. Stars are formed and expire, galaxies merge and planets are transformed. Our world had a past before us and it is expected to have a future. Creation is an ongoing process where no phase of it is privileged to be the ultimate form.

Our Evolving Universe

The galaxies, stars, planets, and life on our world, are long stories-within-stories that are still unfolding. It is remarkable that our Universe has produced such citizens as us, humans, who systematically attempt to construct these stories based on the evidence scattered around. This evidence gathering process we call science has revealed many episodes of some of the stories, but the advances link into other stories that we are yet to discover.

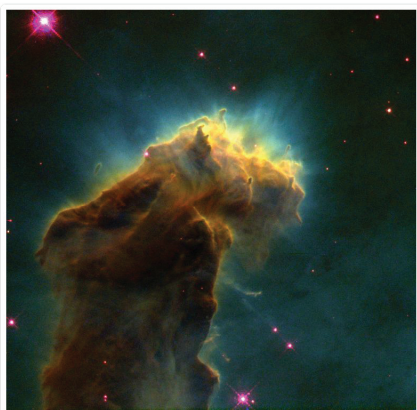
Changing times

The stories are always about evolution and change. The luminosity of our nearest star has been remarkably stable for a few billion years. Yet we know that every stellar body including our Sun has to evolve because they use themselves as fuel. The time scale for an appreciable change is very long compared to our personal lives and even the history of our civilization. Nevertheless, we, the habitants of a rock orbiting a star have understood that the heavens do change. This strongly refutes the paradigm of the middle ages that stated the celestial objects were eternal and did not change.



We think of the Sun, our closest star, as being perfect and almost existing outside of time. But it is a dynamic body, and one day in the far future will run out of fuel.
Image credit: SOHO/Extreme Ultraviolet Imaging Telescope (EIT) consortium. SOHO is a project of international cooperation between ESA and NASA.

There are regions in our Galaxy where new stars are forming out of gas clouds. And we occasionally witness the sudden explosion of an unfortunate one that has used up its fuel. Although the lifetime of a single star is too long for us to follow from birth to death, by observing many of them at different stages and filling the gaps with reasoning we have achieved an understanding of the lives of stars and processes that take place in them.



This stunning image of a nebula is a snapshot of its life. New stars are forming deep inside, which will one day shine brightly.
Image credit: NASA, ESA, STScI, J. Hester and P. Scowen (Arizona State University).

Stars with a golden glow

The Sun was not among the first stars that populated the Milky Way, our Galaxy. Generations of stars formed from the gas clouds, lived their lives synthesizing by nuclear fusion many of the elements of the periodic table up to iron, and finally exploded into the interstellar medium returning matter back to the gas clouds.

During the explosion some elements even heavier than iron were synthesized. This is the only way gold is produced in the Universe. The existence of elements like silver, gold and uranium as well as carbon, oxygen and nitrogen on Earth suggests that the Solar System formed from a gas cloud enriched by the gases expelled into the interstellar medium by previous generations of stars. The continuous formation and death of stars in the Universe have profound implications: our Sun was not always there and will not always be there either!

Our presence is not only dependent on the Sun. It took many generations of stars to produce the elements we depend upon. We are not isolated from the rest of the Universe, interacting only with the Sun: we rely on a galaxy, a spinning web of stars linked by continuous creation and death. The formation of Sun and the planets around it is not the last word of the Galaxy. Our Universe did not stop producing new stars just because it finally gave birth to our Solar System! We are not at the centre of physical Universe, nor are we the climax of it.



Earth-shattering science

An earthquake can be a very depressing experience. It challenges our common notion of the ground. All of a sudden, our trust which has grown through years of daily experiences is betrayed and the stage on which we have all our drama seems to move under us.

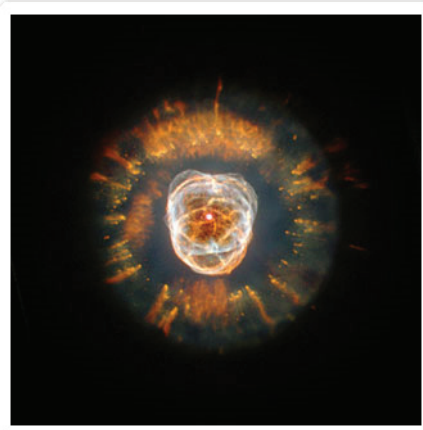
In the news we learn the epicentre of the earthquake and sometimes a short explanation saying that the earthquake happened because a certain plate cracked along a certain fault. A reasonable and boring explanation of a disaster!

Science is not only about how a certain earthquake happened: it goes beyond this, gathering evidence that the lands are moving across the globe! Science tells us that the continents Africa and South America were once attached together, as a superficial gaze at the world map can tell. The lands drift, sometimes pushing each other and it is this stress along the faults that breaks the plates. An earthquake becomes a fantastic phenomenon when it is understood to be a consequence of the long journey of the landmasses.

The implication of the motion of the lands is thought provoking: the Earth, our home and the stage on which our game is played, is not complete, even if it appears sufficiently steady for our practical purposes! Until, of course, an earthquake reminds us that this is not precisely correct. There is no reason for the surface to stop moving just because we started building houses or drawing national borders on a map.



The Earth exists within an evolving Universe so is it any wonder that it experiences changes, such as earthquakes?
Image credit: NASA.



The Sun will produce a planetary nebula at the end of its nuclear life.
Image credit: NASA, ESA, Andrew Fruchter (STScI), and the ERO team (STScI + ST-ECF).

The neutrality of the planet's crust to our presence can be seen to downplay us. Some people see science as a cold bundle of information when it is so objective by its nature. They probably contrast it with the ancient explanation regarding the earthquake as a punishment of a supernatural power placing us in a privileged position to deserve such an attention. Science is about making an educated guess that can sometimes be beyond common sense. It is a remarkable achievement of humanity that we are able to understand earthquakes as a consequence of the journey of the lands across the globe.

Past, present and future

The ocean of culture that we are embedded in implicitly presumes that the creation is a completed process. Our great illusion is to regard the Earth as a completed stage with all of its facilities; the lands, plants and animals created for our service. This is a huge obstacle between us loving our planet as it is. Our world had a past before us and it is expected to have a future. Evolution or creation, whatever one names it, is an ongoing process where no phase of it is privileged to be the ultimate form.

This feature article was written as part of the Cosmic Diary Cornerstone project for the International Year of Astronomy 2009. To find out more, check out www.cosmicdiary.org and www.astronomy2009.org.