There has always been a duality between science and art (Uskoković, 2009; Stegeman, 1969; Young 2011). Some liken the parallel nature of the two as a set of railway tracks, both necessary to convey passengers to an end-point (Uskoković, 2009). The aesthetics of science – elegance within scientific theory – are well documented (Stegeman, 1969). Likewise, the science behind art – how and why particular techniques ‘work’ – is also well established (Young, 2011). One realm though that appears to have received little attention in the burgeoning new domain of Science Communication, is that of science presented as art. Could delivering science in the form of art help to foster a greater public appreciation or interest in science? In itself, this is not a new phenomenon. The depiction of science theory through art has occurred for centuries – if not millennia. However, a review of the literature yields little in the way of publications that actually address this question.

The online realm provides an alternative source for information on the impacts of scientific art in today’s society. So, in the absence of peer-reviewed papers that consider the question “can science presented as art help to increase public appreciation of science?” this review will consider contemporary examples that have indeed succeeded in that goal, using information drawn from web sources.

It is an intrinsic value of our human species that we strive to present the nature of the universe in human terms (Young, 2011). Young suggests that the purpose of scientific inquiry is to reveal an underlying elegance – a “beauty inside”. Moreover, Young states that “works of art – aesthetic objects – can, as analogues, enable us to experience what it means in science to imagine the elegance of the universe or the extravagance of organic life.” And it would appear that humans gravitate towards such aesthetic objects. As Etoff (1999) states, our “extreme sensitivity to beauty is hard-wired ... it is governed by circuits in the brain shaped by natural selection.” Beauty can be broken down into four key components: clarity, symmetry, harmony and vivid colour (Etoff, 1999). Etoff continues that “the properties of beauty are the same, whether we are seeing a beautiful woman, a flower, a landscape or a circle.”

The circle is an interesting example for Etoff to have picked. It echoes the popular story of a Renaissance artist (either Da Vinci, Giotto or Michaelangelo, depending on the storyteller) drawing – freehand – a perfect circle for submission to the respective Pope. The story goes that the Pope recognised the technical difficulty in producing the mathematically-accurate shape, and commissioned the artist. Even today, Da Vinci’s sketches of mathematical and scientific principles –
such his helicopter prototypes and the Vitruvian Man – are appreciated as much for their aesthetic values as for the knowledge they convey.

The works of some eighteenth- and nineteenth-century naturalists have also come to hold positions of high art, such as those of Maria Sibylla Merian and John Gould. Merian – a pioneer in many respects – travelled from Germany to Surinam with her daughter in 1699 to artistically document the flora and fauna of the new South American colony. Her gorgeous and detailed lithographs brought to the populace of Western Europe not only the wonders of the New World, but also presented to the public the then-unknown process of insect metamorphosis. Her works were held in high regard by the social elite, and even today her major work *Metamorphosis Insectorum Surinamensium* is considered a collector’s item (Etheridge, 2011).

The lithographic works of English naturalist John Gould hold a high place in art culture, particularly in Australia. Gould is credited with describing 44% of Australia’s bird species, and 45 mammal species (Australian Museum, 2013). Gould even described Darwin’s finches for him. But it is for his lithographs that Gould is most familiar: lavish volumes and imperial folios filled with magnificent coloured plates, “images symbolic of Victorian gentility” (Australian Museum, 2013). The appreciation of Gould’s images is exemplified by the prominence they take in Australian museums and galleries, as well as the ‘Gould Rush’ purchasing scrabble in the 1980’s. It is easy to see that the public appreciate the early naturalists’ works for reasons beyond the science that they communicate. Indeed, Walter Buller’s 1888 chromolithograph of the extinct Huia features as the centrepiece of the University of Otago’s 2013 calendar!

A modern-day equivalent is the emerging interest in – and appreciation of – micrographic art. That is, photographs taken using microscopes. As microscopy and fixation techniques continue to advance, paralleled by improvements in camera technologies, micrographic art is revealing this incredible imagery in fine detail and stunning colour. Physical chemist and nanoscientist Vuk Uskoković suggests that micrographs “captured ... with a purely scientific purpose may trigger the sense of aesthetic awe, similar to the one we awake in facing a painting, photograph or other visual artform.” And aside from being aesthetically pleasing, these images are often of great scientific importance, too (Uskoković, 2009). Camera company Olympus sponsor the annual “BioScapes” International Digital Imaging Competition, for just such images. Judging criteria for entries are three-fold: *Science* ("uniqueness of the specimen or process shown, importance of work, new information revealed"), *Aesthetic* ("beauty or impact of the image; balance and composition") and *Technical Merit* ("difficulty in capturing structures or data shown") (Olympus BioScapes, 2013). Prize-winners and commendees have included subject material as diverse as pollen, DNA and He-La cancer cells. Olympus president Hidenao Tsuchiya says “Microscope images forge an extraordinary bond between science and art... We look at BioScapes and these beautiful images as sources of education and inspiration to us and the world.” (Olympus BioScapes, 2013)

And indeed, they do provide inspiration across the world. The BioScapes website holds these images in an exhaustive online gallery, and the individual images are shared far and wide, from websites as diverse as National Geographic to PopSci to Business Insider, as well – of course – as social media. Says Uskoković of micrographs: “they do not show contours that resemble already familiar shapes, but rather contain an impressionistic blend of colours and lines, inviting us to appreciate Nature’s language, implicit in every tiny detail of these images.”
Photography and painting are not alone in the mediums of art for garnering an interest in science. As Young (2011) explains, while the “still, focused images makes it possible to see the beauty within... moving pictures [are] designed to tell a story from one narrative from to the next. A movie makes imaginable transmutations and evolution.”

Science has always held a place in film, covering niches ranging from home-cooking shows about food additives to cinematic juggernauts such as Jurassic Park. However, science in film tends to target a very specific audience, and few examples could claim universal appeal. One exception may be the BBC Planet trilogy, made up of the documentary series’ The Blue Planet (2001), Planet Earth (2006) and Frozen Planet (2011). Produced by Alastair Fothergill and narrated by Sir David Attenborough, “this trilogy has changed the face of natural history filmmaking, bringing the wonders of the planet to mass audiences worldwide” (Frozen Planet in Concert, 2013). Considered to be the flagship of the trilogy, Planet Earth’s widespread popularity is undeniable. According to the BBC’s 2007 Annual Report, the program “received the highest audience appreciation score of [that] year.” Seven years after its release, Planet Earth still holds number one position on IMDB’s list of ‘Highest Rated TV Series’, trumping contenders such as The Sopranos, Game of Thrones and even The Simpsons. The reviewers laud what is essentially an eleven-episode nature documentary. “Rarely does television touch heart and soul as effectively as Planet Earth,” writes Tom Shales of the Washington Post.

Perhaps the reason for Planet Earth’s popularity is that it elevates the genre into the realm of high art. Every shot is meticulously composed, with those four elements of beauty (clarity, symmetry, harmony and vivid colour) ever-present in the subject matter. That it took four years to create seems acceptable – even forgivable – when compared to the aesthetic qualities of series’ that are produced in a year. HiDef Digest (2007) describes the series as “pure cinema … a work of great majesty,” two terms not often associated with television documentaries. Planet Earth is nothing short of an artistic masterpiece and has succeeded in delivering its messages of science and conservation on a level unparalleled among natural history documentaries.

In The Origin of Species (1958), Darwin penned the classic phrase, “there is a grandeur in this view of life.” Planet Earth is the embodiment of this statement. With gyroscopically-stabilised cameras, lenses that can capture fine detail from over a kilometre away, unprecedented use of helicopters, and cranes, tracks and dollies employed in the most inaccessible of locations, this cinematic masterpiece delivers jaw-dropping visuals with not a single wobbly frame. Truly, a grand view of life.

In addition to the majestic wide shots, the series features intimate footage of animals exhibiting novel behaviours – many often filmed for the very first time. At times heart-warming (polar bear cubs emerging from their den for the first time), other times heartbreaking (a young elephant, lost in the desert, following its mothers footprints... in the wrong direction), much of this unique behaviour is a result of the producer employing cameramen to sit in hides for extended periods of time. Such images are indeed worth the wait. An edge-of-your seat snow leopard chase provides viewers with a far better appreciation for these creatures and their daily struggles than images of sedentary snow leopards filmed in zoos. This is another criterion that sets Planet Earth apart from mass-produced programs, or those that are constrained to a production short timeframe.

The visual aesthetics of Planet Earth are further enhanced by a tight-fitting musical score. Music is an art, and in Planet Earth it is cleverly employed to elicit an appreciation of the visual subject matter,
sometimes in the form of emotional responses. Composer and conductor George Fenton has worked with the BBC for 20 years, and has collaborated on over a hundred natural history programs. He scored the full-orchestra soundtracks for all three of the Planet series. Part of the musical appeal is that while each series has its own unique leitmotif (a distinct and reoccurring melody), all three leitmotifs share elements that are related, establishing a further connection between the chapters of the trilogy.

All three Planet soundtracks have been critically recognised and acclaimed. In 2002, The Blue Planet won the Ivor Novello award, the BAFTA Best Original Television Music award (of the nominees, it was the only non-fiction entrant), and the Primetime Emmy Award for Outstanding Musical Composition (against local contenders JAG, 24 and The X-Files). The Planet Earth soundtrack went on to win an Emmy and a Classical Brit, among others. Such accolades are testament to the role music plays in eliciting an appreciation of science.

But Fothergill and Fenton didn’t stop there. A trilogy of concert series was established, where local symphony orchestras played live to projected scenes from the series. In this case though, the visuals took second place. People had come for the music. The Blue Planet In Concert toured 11 countries across four continents. Planet Earth In Concert had a more modest run, visiting only the USA, UK, Thailand and Australia, but attracted audiences of up to 12,000 per performance. Critics hailed Planet Earth In Concert as “a joyous and life-affirming show ... a triumph of both the natural world and the BBC’s skill in recording it” (Dean, 2012), and said that “here, the music provides our interpretation of their great feats. As birds ascend Everest, music that sounds like a war-song welcomes them to their landing spots” (Spoonfed, 2011). The message had not been lost. People were indeed appreciating science delivered in the form of art.

Art is a medium that transcends the barriers of language. It is accessible to those who speak another tongue, or who may be illiterate. And it in the case of music, it even transcends the sense of sight. I believe the more beautiful an artwork, the more likely people will be to appreciate the story it offers. Science is conveyed through art, and I feel that sometimes it does reach a much broader audience than when presented in its more usual formats. Why is this important? Uskoković argues that “through promoting values that spur human creativity, arts have a chance to inconspicuously steer the evolution of our society in all of its aspects.” My life goal is to save the world. And by producing visually compelling, aesthetically beautiful and scientifically important works of cinematic art, I may just be able to do that...

**Resources**


HiDef Digest. 2007. *Planet Earth: the complete BBC series (Blu-ray)*. http://bluray.highdefdigest.com


*Planet Earth*. 2006. Series Producer Alastair Fothergill. BBC/Discovery Channel/NHK co-production


