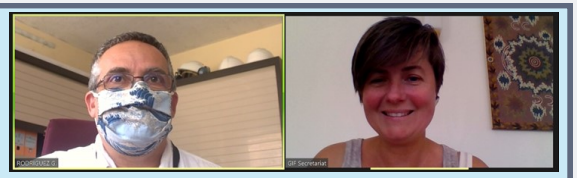
2D-3D: When paintings have paved the way for GEN IV reactor design studies and more…



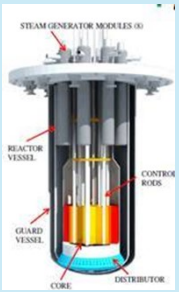
GILLES RODRIGUEZ (WEARING "THE HOKUSAI GREAT WAVE MASK") & SYLVIA ANGLADE-CONSTANTIN

From the Quattrocento to the first 3D images

For over 20 years now, 3D modeling and reconstruction tools have been key features of reactor design. But do we know when and how it all began?

It all started during the Quattrocento (Early Renaissance) with the work of painters who were also mathematicians: Paolo Uccello et Piero della Francesca. Even if these techniques of the vanishing point perspective were already known in classical times, they were rediscovered with the work of these two painters.

The "Ideal City" attributed to Piero della Francesca (c. 1470-75) can be seen at the National Gallery of the Marche housed in Urbino's Ducal Palace (Italy). It is not the first painting using this type of perspective but it is definitely the perfect attempt to move from 2D to 3D. All the mathematical theories behind this painting were written in a book to explain the perspective theory. And today most of them are still used when we design a reactor with CATIA or SOLIDWORK Softwares.



Closer to us, this teapot is the first object ever fully modelled in 3D. The teapot was chosen as a model in 1975 by Newell, a member of the pioneering graphics program at the University of Utah, thus earning the nicknames « Newell Teapot » and « The Utah Teapot ». Its rounded shape and complex features made it an ideal study. The teapot is still exhibited at the Computer History Museum in Mountain View (Ca, USA).

2D-3D: When art investigates beyond 3D…

In 2007, photographer Jean-François Rauzier experimented with perspective in a tribute to Piero della Francesa, but with a pessimistic view and a new numerical technique compiling thousands of numerical pictures taken throughout Europe (he calls it the HyperPhoto process). This allows enlarging infinitely without losing any details and keeping the same quality. This is close to fractal mode (not purely 3D but far more than 2D). Jean-François Rauzier works in Paris. Today, these two works of art are talking to us much more due to the COVID situation we all have encountered in 2020, and all these empty cities.

The QR Code provided here allows you to experience the Hyper Photo in this specific picture, which is currently exhibited at the Chateau de Vascoeuil in Normandy (France).

« CITÉ IDÉALE »

(SÉRIE PREMIÈRES OEUVRES)
2007
120 X 370 CM
TIRAGE PHOTOGRAPHIQUE
SUR DIBOND

In the fall, the NEA/GIF may have the pleasure of exhibiting in its offices one of the artist's creations. We will of course keep you informed if such were the case.

Last but not least, the English painter Patrick Hughes creates what he defines as "Reverspective". He adds a "new dimension" to the perspective, or as quoted: "When the principles of perspective are reversed and solidified into sculpted paintings something extraordinary happens; the mind is deceived into believing the impossible, that a static painting can move of its own accord". These works of art cannot be reproduced with a 2D representation, you may see them by video (please click on the artist's webpage) or better yet: seen in real, they are so impressive. The result is absolutely fascinating, the paintings become alive!

http://www.patrickhughes.co.uk/

The work of Patrick Hughes can be found in public collections, such as the Baker Museum, the Birmingham Museum and Art Gallery, the Denver Art Museum, the Würth Museum or in several hotels around the world. (private collections).

To be continued…

The GIF Newsletter — Special Edition

2D-3D: When art uses perspective techniques to create emotion

Vanishing point perspective techniques became the rule in Europe from the Renaissance period, therefore making it a standard in art all over Europe. This was then exported in Japan at the same time as Prussian blue. Maybe this explains why the most famous print in the Western world is the "The Great Wave off Kanagawa" by Hokusai? In this woodcut print, the artist uses the vanishing point perspective to great effect: the mythical Mount Fuji appears so small next to this giant wave that it enhances the feeling in the foreground of the wave engulfing the boat, and even Mount Fuji itself!

Several copies of this work of art are kept in collections around the world. Follow this link for more curious and captivating information on both the wave and the pigment.

For instance, did you know that Prussian blue acts as a barrier in our gut by stopping radionuclides going into our blood? Furthermore, Prussian blue is on the WHO list of essential medicines under "antidotes and other substances used in poisonings".

In a totally different field, impressionist painter Caillebotte used perspective ostentatiously to depict a sad and lonely Paris. The painter uses vanishing perspective point techniques skillfully to paint buildings and wet pavement, but also to express his discontent with the city's major modifications brought by Baron Haussmann (who also had perspective in mind..) in the second half of the 19th century. For Caillebotte, the huge boulevards have impacted Paris' festive atmosphere, people are alienated from this dreary architecture and avoid each other, protected by their umbrellas. A far cry from the Montmartre "guinguettes" (open-air cafés)!

Twelve French museums and twenty five American ones keep one or several of Caillebotte's paintings, among these the Musée d'Orsay in Paris, but also Minneapolis Institute of Art, Texas Kimbell Art Museum, Milwaukee Art Museum, Norton Simon Museum or Art Institute of Chicago.

Did you know that Caillebotte was also deeply involved in engineering and naval architect activities for his personal enjoyment?

2D-3D: When art becomes optical illusion…

One cannot mention "new dimensions", perspectives and mathematics without mentioning the work of Dutch artist M. C. Escher. The world he draws is physically impossible, but is rendered with such emotion it makes us want to live there nonetheless. Escher's collection is exhibited at the Escher in het Paleis, in The Hague (Netherlands). The museum has a floor dedicated to fun attractions: hands on experiments of Escher's work.

We will end this voyage in multiple realms with the following sentence which so perfectly connects art to science:

"We adore chaos because we love to produce order" dixit Escher.

We hope this little wandering between art and technique for this special summer edition will make you want to see all these artworks in real life or with a different…perspective.

We take this opportunity to suggest a photo/artwork contest on a similar theme: "When nature meets science".

The best pictures/artwork will be reproduced in the Newsletter, following the October EG/PG meetings.

Sources:
https://fr.wikipedia.org/wiki/Piero_della_Francesca; http://publimath.univ-irem.fr/glossaire/FR014.htm; https://www.larousse.fr/encyclopedie/personnage/Piero_Della_Francesca/138138 https://www.aparences.net/periodes/le-quattrocento/paolo-uccello/; https://www.kazoart.com/blog/loeuvre-a-la-loupe-vague-hokusai/; https://au-coeur-du-japon.com/blogs/blog-japon/tout-ce-quil-faut-savoir-sur-le-bleu-de-prusse; https://www.abc.net.au/news/2017-07-21/prussian-blue-hokusai-great-wave-how-a-pigment-changed-the-world/8731732; https://www.rivagedeboheme.fr/pages/arts/peinture-19e-siecle/gustave-caillebotte.html; http://www.artcyclopedia.com/artists/caillebotte_gustave.html; https://www.le-monde-etrange-de-escher.fr/maths_escher.php#