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Analytic Summary

Beautiful Scientific Arts

Alonso, Alicia (Universidad del País Vasco. Instituto Biofisika. Dpto. de Bioquímica. Campus sarriena, s/n 48930 Leioa); **Prieto, Manuel** (Universidade de Lisboa. Instituto Superior Técnico. iBB-Institute for Bioengineering and Biosciences. 1049 001 Lisboa); **Goñi, Félix M.** (Universidad del País Vasco. Instituto Biofisika. Dpto. de Bioquímica. Campus sarriena, s/n 48930 Leioa): **The Circle Game** (Orig. en)

In: *Rev. int. estud. Vascos*. 69, 2 (2024)

Abstract: This essay is devoted to a multidisciplinary analysis of the circle (and the related figures sphere and cylinder) in Nature, the Arts and the Sciences. The figures are first defined in terms of Euclidean Geometry. Then follows a historical consideration of the shapes of the celestial bodies, and of the Universe itself, and the surprising formal parallelism of the Copernican cosmos and Bohr's atomic structure. The relevance of the circle in Mysticism, Religion and the para-sciences is discussed. Specific sections are devoted to the circle in Mechanics, Art, Architecture and Biology. Abundant graphical examples are provided. A closing discussion deals with the difficulties in explaining in a rational way the obvious attraction felt by humans along the ages for these deceptively simple shapes.

Keywords: Circle. Euclidean geometry. Cosmology. Physics. Biology. Art. Architecture. Mysticism.

Esteban, María Jesús (CNRS UMR 7534, PSL University, Université Paris-Dauphine, Place de Lattre de Tassigny, 75775 Paris 16, France): **Mathematics in art, for art and as art** (Orig. en)

In: *Rev. int. estud. Vascos*. 69, 2 (2024)

Abstract: The fundamental role of mathematics as an inspiration for artists, but also as a tool for art creation, is presented in this paper following different art fields, like architecture, sculpture, painting, photography, literature and poetry, movie making and music. The historical viewpoint is completed with recent applications of mathematics to create art in the digital era. Finally, the article contains a discussion about the possibility of the mathematical creation being considered artistic.

Keywords: Mathematics. Geometry. Art. Music. Musical composition. Architecture. Painting. Sculpture. Music composition. Animation movies.

Aldasoro-Zabala, Aloña; Hervella, Montse; De-la-Rúa, Concepción (University of the Basque Country/Euskal Herriko Unibertsitatea. Faculty of Science and Technology. Dept. of Genetics, Physical Anthropology and Animal Physiology. Sarriena auzoa, z/g. 48940 Leioa): **Evolutionary analysis of human prosociality: an approach based on the study of HPA axis related genes in informative ancient populations** (Orig. en)

In: *Rev. int. estud. Vascos*. 69, 2 (2024)

Abstract: An analysis of genetic variants (SNPs, Single Nucleotide Polymorphisms) related to behaviours that may have favored the social and biological adaptation of our species in the last ~40,000 years has been carried out. These genetic polymorphisms are related to behaviours regulated by the HPA (Hypothalamus-Pituitary-Adrenal) axis and have been analysed in a sample of human genomes collected from different paleogenomic databases. The obtained results show the complexity of the "prosociality" phenotypes, detecting however the existence of possible temporal changes in the allelic frequencies of some genes, such as *OXTR* (Oxytocin Receptor), which can be related to the development of prosocial behaviours since the end of the Upper Palaeolithic.

Keywords: Prosociality. Cognition. Evolution. HPA axis. Human Paleogenomes. *OXTR* mutations.

Marco, Tomás (Jakiunde, Zientzia, Arte eta Letren Akademia. Prim 7. 20006 Donostia): **Music and numbers** (Orig. en)

In: *Rev. int. estud. Vascos*. 69, 2 (2024)

Abstract: The article starts from the mathematical origin of music in Greek culture, underlining the birth of notes, modes and scales, without losing sight of references to other cultures. On this basis, attention is paid to the medieval development of Greek modes and polyphony. Special attention is given to the vertical listening of music, the tempered scale and tonal harmony, and the relationship between music and architecture, illustrated by ancient and modern examples. Finally, it looks at stochastic music, fractals and other music of mathematical origin. The article closes with a projection of the future.

Keywords: Mathematics. Numbers. Greek music. Medieval music. Stochastic music. Vertical listening to music. The tempered scale. Tonal harmony.

Olcoz Basarte, Iñigo; Eslava Arraiza, Sergio; Arbona Puértolas, Leire; Morrás Andrés, Esteban (Veridas Digital Authentication Solutions. Pol. Industrial Talluntxe, II. 31192 Tajonar): **Music & AI: Requiem or Symphony** (Orig. en)

In: *Rev. int. estud. Vascos*. 69, 2 (2024)

Abstract: In the current era where Artificial Intelligence (AI) is leading to the automation of cognitive skills that were previously only imaginable within the capabilities of human intelligence, and where the synthetic generation of art in the field of musical composition is also reaching the general public, we wonder whether the impact of Artificial Intelligence on music will lead to a democratisation of new possibilities for artistic expression or, on the contrary, will result in a trivialization that leads to a progressively lower musical quality. To address this question, this article embarks on a journey through the historical dialectic between music and technology, seeks parallels in disciplines such as chess that have undergone similar processes, explores the inseparability between merit and artistic outcome and between musical and extra-musical factors, analyses the recent and current impact of algorithmics on avant-garde musical composition, reviews the current legal and juridical status regarding musical authorship, and ethically reflects on Artificial Intelligence through the experience of working daily with AI tools. Our conclusion is that music must prevail, because the human being must prevail.

Keywords: Music Creation. Technology. Artificial Intelligence.

Aguirresarobe, Javier (Jakiunde - Zientzia, Arte eta Letren Akademia. Prim 7, 20006 Donostia): **The wake of the light in the cinema** (Orig. en)

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Abstract: 'The filmmaker's journey in the wake of light is a brief chronicle of the journey of the cinematographer on the set of a film. First, we ask ourselves who he is and what his function is, and then we enter into the delicate terrain of his activity, his knowledge and his relations with the group of specialists in filmmaking. The article also reports on the substantial step that has been taken in the industry with the introduction of the digital system over the analogue system and its influence on the mentality and technique to be developed by the cinematographer.'

Keywords: Director of photography. Film industry. Shooting films. Light in cinema.