

# BEAUTY IN ART, NATURE, AND SCIENCE

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**Background:** Beauty has long captivated the human spirit, inspiring artists, poets, and scientists alike. From patterns found in nature to the masterpieces crafted by human hands, beauty surrounds us in myriad forms. Understanding and appreciating this beauty not only enriches our lives but also deepens our understanding of the world around us. In best case, art may be a medium to explore and engage with the dynamic interplay between order and disorder, leading to new insights, experiences, and ideas. In our artist residency project, we were asking ourselves, if there are similarities among the perception of beauty in art, nature, and science.

**Research question:** Is the principle of "Form follows function" - connected to the Bauhaus movement about 100 years ago - applicable even in areas beyond pure design drafts? What do we consider as beautiful in nature and science? Is this something objective, which we can quantify and measure?

**Method:** Data extracted from the protein database <https://www.rcsb.org/> were analyzed, sorted, and rearranged. The resulting data served as the basis for visualizations and were used to convert pure numbers into "works of art," arranged in tableaus for comparison (see figs. 1 to 3, and QR code for more). The created geometrical structures showed specific levels of symmetry, complexity, balance, and harmony, and may be considered as nice or beautiful. Additionally some of the evolving pattern reminded to flowers, butterflies, or other structures, which usually reside on completely different scales.

**Discussion:** Max Bense, a German philosopher, writer, and educator, used the concept of "aesthetic information," which he defined as the mixture of order or disorder present in a work of art. According to that, both structured elements (order) and random or chaotic elements (disorder), and the balance between these elements determine the aesthetic value of a work. Thus, our experiment nicely connects the "aesthetic information" from the protein data to convert them into beautiful presentations. Finally, Bense's concepts of order and disorder offer a lens through which we can explore and understand the intricate relationships between nature, science, and aesthetics and we can deepen our appreciation of the beauty, complexity, and interconnectedness of the world around us.

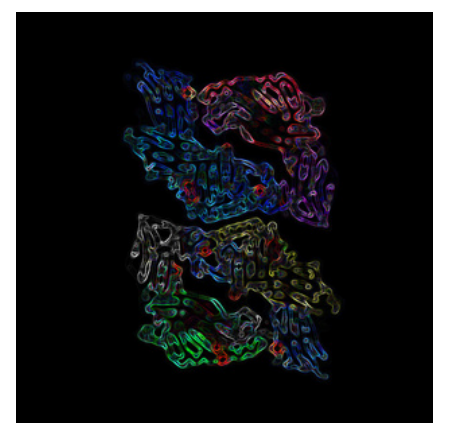
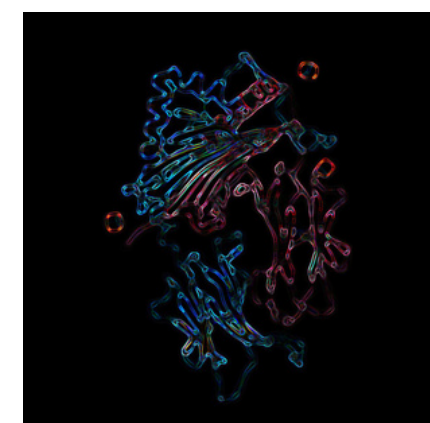
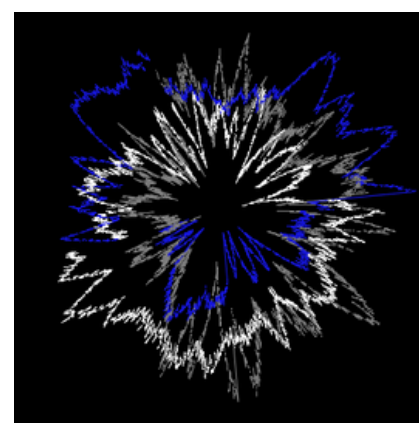
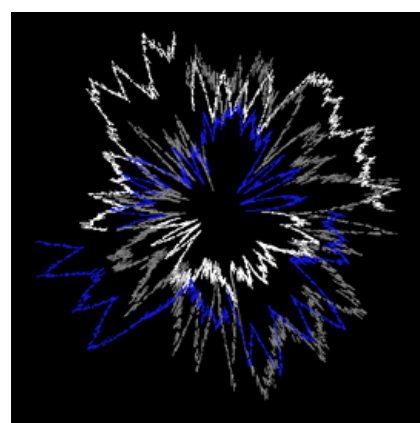
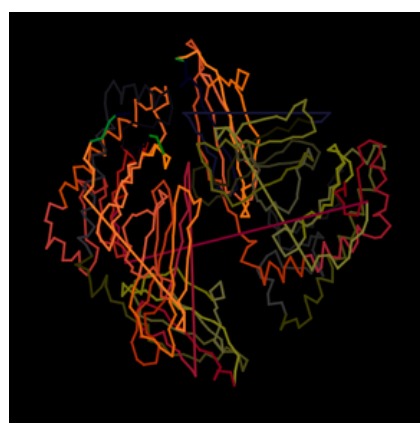
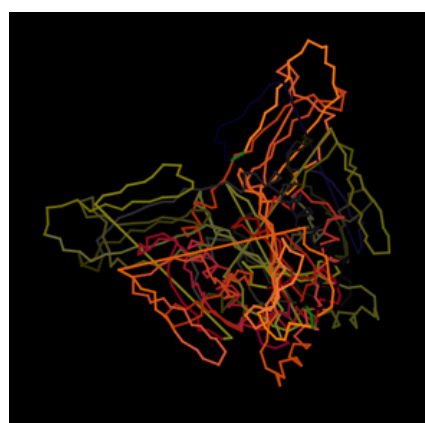
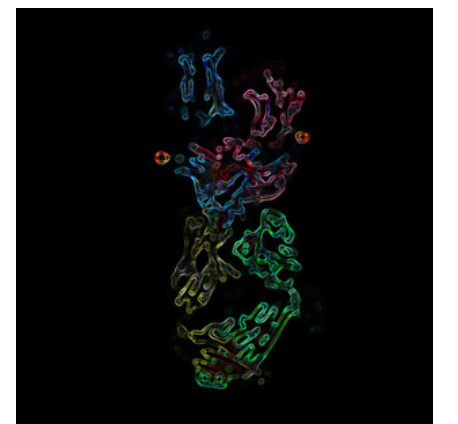
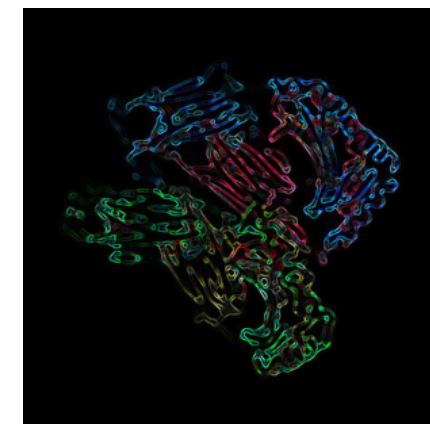
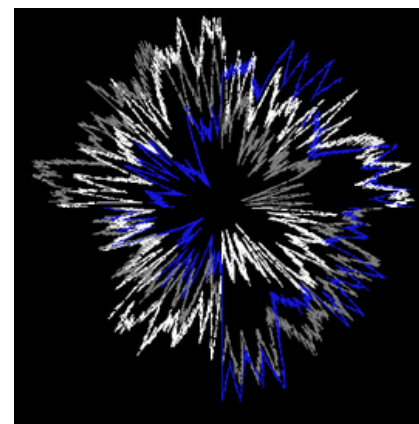
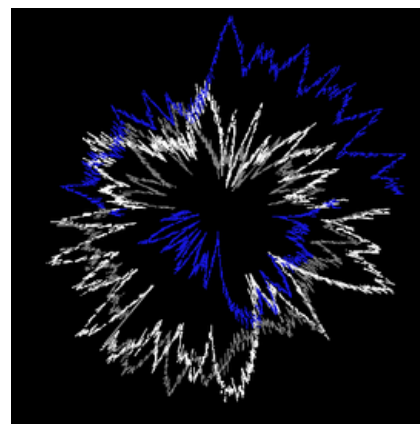
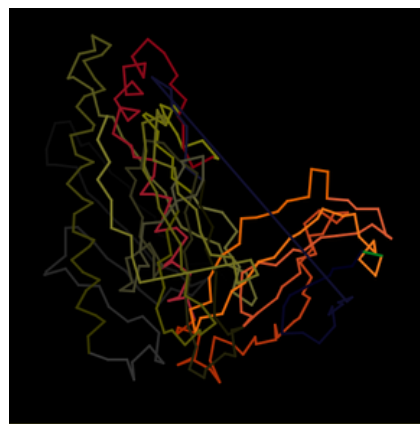
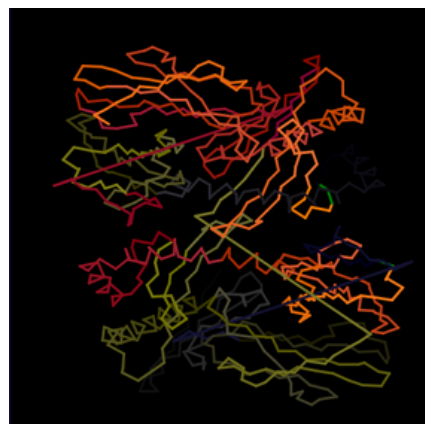


Fig. 1: 6TDS, 7XQT, 6LKP, 6J2F: x, y, and z positions of the CA atoms connected by continuous lines

Fig. 2: 4CVX, 3WEX, 3RDT, 3QIW: x, y, and z coordinates of all atoms displayed in polar coordinate system

Fig. 3: 4IOP, 3QIU, 1FNG, 1I3R: images taken from the PDB database, processed by several photoshop filters

## Quotes on beauty in Art:

Beauty is everywhere a welcome guest.

*Friedrich Schiller*

This curving, graceful line is essential for creating beauty in art. The use of this line can evoke a sense of liveliness, elegance, and aesthetic pleasure in the viewer.

*William Hogarth*

There is no one set of criteria that all beautiful things must possess; instead, beauty is understood through a range of diverse instances that share certain similarities.

*Ludwig Wittgenstein*

Beauty arises from the harmony and coherence of ordered structures, whether they are found in nature, art, or technology.

*Max Bense*

## Quotes on beauty in Science:

The scientist does not study nature because it is useful; he studies it because he delights in it, and he delights in it because it is beautiful.

*Henri Poincaré*

I can appreciate the beauty of a flower. At the same time, ... I could imagine the cells in there, the complicated actions inside, which also have a beauty.

*Richard Feynman*

This habit of recognizing principles amid the endless variety of their action can never degrade our sense of the sublimity of nature or mar our enjoyment of its beauty.

*James Clerk Maxwell*

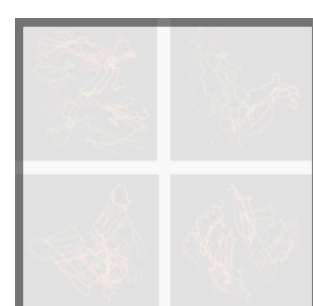
Initially, I was just struck by the beauty of the fish, like I had been by the segmentation pattern of flies: it's always nicer to work on something you find beautiful.

*Christiane Nüsslein-Volhard*

## Ongoing Research:

Please support our research and share your opinion: tag the images from Figs. 1 to 3 which you like best with a little dot.

Thanks for your participation!



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