Chapter 8
NanoArt:
Nanotechnology and Art

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ABSTRACT

This chapter is an attempt to introduce NanoArt. It goes back in time to the first uses of nanomaterials and nanotechnologies to create art and continues with the beginnings of NanoArt. Then, it follows a status on this new artistic-scientific discipline and the movement that evolved from recent technological developments in the multidisciplinary area known as nanotechnology. The chapter informs about the international juried NanoArt competitions, displays select artworks collected in the NanoArt21 gallery, and finally presents thoughts of select nanoartists and art people.

INTRODUCTION

Nature, including people, is built from nanostructures (Jones, 2008). Nanotechnology is part of the human evolution and enables people to visualize and manipulate objects that were invisible in the past. During previous centuries people applied nanotechnologies without realizing that fact. Most people are still not aware of nanotechnology although they are using nanotech products.

Over the past two decades, the ability to measure and manipulate matter at atomic and molecular scales has led to the discovery of novel materials and phenomena. These advances underlie the multidisciplinary areas known today as nanotechnology. The responsible development and application of nanotechnology could lead to create jobs and economic growth, to enhance national security, and to improve the quality of life. Some of the benefits would be cleaner manufacturing processes, stronger and lighter building materials, smaller and faster computers, and more powerful ways to detect and treat disease (The Nanotechnology Initiative Strategic Plan, 2004).

Due to the quality of images obtained by studying the nanostructures, most people perceive them as artistic objects. One of the aims of creating NanoArt is to familiarize people with the omnipresence of the nano world and raise the public awareness of the impact of nanotechnology on our lives. There are legitimate concerns about nano products from health and environmental

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point of views, and nanotech companies should develop their products responsibly. NanoArt can be considered one of the best vehicles to promote a responsible scientific and technological development to the general public.

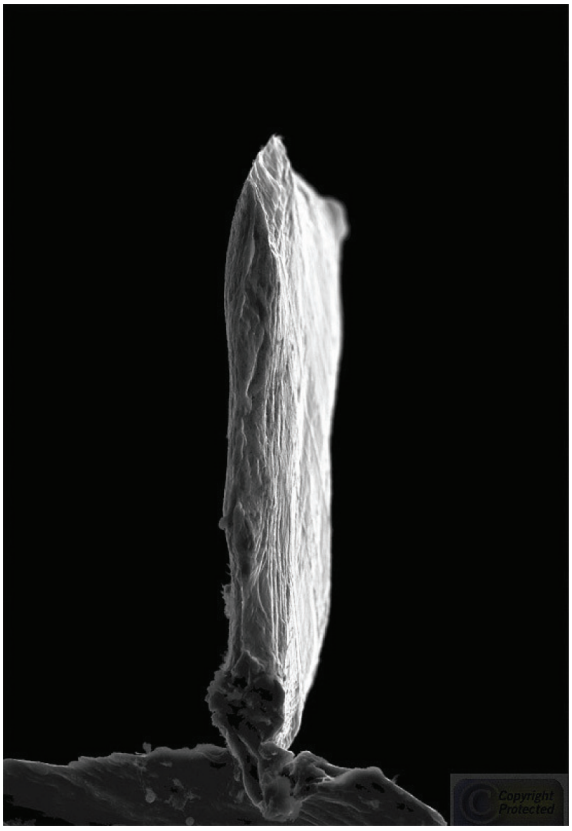
NanoArt is a complex artistic-scientific process that comprises three major components:

1. Creation of the nanosculpture (sculpture at atomic and molecular levels, by manipulating atoms and molecules using chemical reactions and physical processes) or discovery of the nanolandscape (natural nanostructures, including biological)
2. Visualization of the nanostructure (which is facilitated by the use of advanced microscopes) and image capture
3. Artistic interpretation of the scientific images using different artistic techniques in order to convert these images in pieces of artwork to be showcased for large audiences and to educate the public with creative images that are appealing and acceptable (Orfescu, 2011). Figure 1 shows a nanosculpture created by embedding graphite nanoparticles in a polymer cast on glass. The structure was coated with gold and visualized with a scanning electron microscope. The image was captured in a computer and printed on luster ultra premium photo paper with archival ink.

ART AND NANOMATERIALS IN PAST CENTURIES

Altamira, Spain, 13000 B.C. The man grabbed a piece of charcoal from the cave floor, put his hand on the wall, and drew its contour without knowing that he was using a nanomaterial to create a piece of artwork. He just wanted to draw his hand. He also deposited layers of graphene (which is a nanomaterial) on the cave's wall without any knowledge about nanotechnology (Museo de Altamira, 2011).

Figure 1. Cris Orfescu, "NanoMaiastra – Brancusi, In Memoriam." (© 2008, C. Orfescu. Used with permission).



Altamira cave in Spain is famous for its Upper Paleolithic cave paintings featuring drawings and polychrome rock paintings of wild mammals and human hands (Cave of Altamira and Paleolithic Cave Art of Northern Spain, 2011). Archaeological excavations in the cave floor found rich deposits of Upper Solutrean (c. 18,500 years ago) and Lower Magdalenean (between c. 16,500 and 14,000 years ago) artifacts. These artifacts are part of the Paleolithic Age, or Old Stone Age (Grey, 2008). The artists used charcoal and ochre or hematite to create the images, often scratching or diluting pigments to produce variances in intensity and creating strong contrast between light and dark.