



جامعة الإسكندرية  
كلية الفنون الجميلة  
قسم الديكور

## تأثير تقنية النانو على التصميم في العمارة الداخلية

### NANOTECHNOLOGY'S INFLUENCE ON INTERIOR DESIGN

رسالة ماجستير مقدمة إلى قسم الديكور (شعبة العمارة الداخلية)  
بكلية الفنون الجميلة جامعة الإسكندرية

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### **First chapter:**

This chapter discusses nanotechnology definition, its historical development and the influential factors that led to the emergence of such a technology that will improve the interior materials thermal, physical, chemical and mechanical properties. This chapter consists the concept of nanotechnology, different definitions thereof. It also included Nanoscale, an introduction about Nano materials, means to utilize nanoscience to improve materials properties in different sciences fields and nano classification, that is, fullerenes and nano particles. And an introduction about the effect of nanotechnology on modern materials in interior architecture such as paintings, tiles, ceilings and floors.

### **The second chapter :**

This chapter tackles the development of modern materials through nanotechnology that enables human to live in a healthy space, which determinants shall have several properties including self- healing, self- cleaning, anti- scratch, anti- bacteria, air- filtration and hazardous radiations absorbability. They also have the ability to analyze temperature, as well as, thermal isolation and temperature organization abilities, photo-catalysis, anti- fire, anti- fingerprints properties. The chapter also includes sections about replacing traditional internal architecture materials with modern nano materials with self- cleaning, self- healing, and pollution- reduction properties. It also discusses the effect of nano on both forming any material and controlling its qualities, thus making designing process more creative and more flexible.

### **Chapter three :**

This chapter discusses an analytical study for two international projects that have influenced the modern materials of nanotechnology in designing process, the relation between the development of materials by nanotechnology and the development of designing thought among interior architecture pioneers, and this how it provides new possibilities and potentials for the architecture form and the interior architecture that resulted in developing new architecture under the name of "Nanoarchitecture". The " Green nanotechnology", combining both green architecture and sustainability, plays a major role in preserving energy, renewing resources and reserving the environment.

### **Chapter four :**

This chapter sheds light on the future designing of nanotechnology and the internal architecture changing form using nano-robot, how to form the inner space in terms of the possibility to create live spaces in interior design, not just space determinants; ceiling, floors and walls, in addition to, furniture and appliances. This chapter discusses how nanotechnology has imposed great influence upon designing as it turned into a live design where the form, color and formability have changed. Concluded with results and recommendations.



From the outset, it should be understood that molecular-architect and interior design buildings are still theoretical in nature. Though the projects that I have developed over the past decade are indeed based upon technologies that, before long, will be realized, the applications of molecular engineering, architectural included, remain speculative.

Molecular Nanotechnology (MNT) represents a new phase in the evolution of manmade structures. The central thesis that nanotechnology is "capable of producing almost any chemically stable structure that can be specified" was first advanced by the physicist Richard Feynman in 1945. Prompted by Feynman, physicist-designer William Katavolos expanded the study of MNT to the growth of architecture, foreseeing the production of a large floating city. Katavolos remarks, "We are rapidly gaining the necessary knowledge of the molecular structure of these chemicals with the necessary techniques that will lead to the productions of materials that will have a specific program of behavior built into them."

Nanobots will produce clear sheets of diamond, a few millimeters thick, to form the exterior membrane of a building. These membranes could be opaque, or by electro-molecular realignment, they could become translucent or transparent. Such astonishing versatility within the molecular product is termed "morphability" - one of the quintessential aspects of MNT. Empowered by millions of controlled nanomotors, the artifact easily alters its characteristics.

Further advantages of morphable substances include such applications as interior room partitioning and adjustable, self-adaptive furniture that responds to position, attitude, and comfort requirements. J. Storrs Hall has developed "Utility Fog" - a linked mechanism that transforms an object into any shape. If one surfaces a floor with a layer of "Fog," furniture could extrude or dissolve into various forms or styles. Likewise, if interior walls are surfaced with "Fog," partition, layout, decor-the entire domestic environment could be changed at will. With all the versatility of these substances, objects now familiar to us will appear new. Architects and interior designer will indeed be presented with rather different design factors

The word "growth" is extensively used in the field of MNT, and is accepted not just as an analogy to nature, but rather as an artificial reenactment of natural growth processes. It is altogether reasonable, therefore, to adopt "growth" as a basis for design expression.

Throughout the history of architecture, formal expression has derived from methods of construction. Molecular growth will bring us back to natural form. This is not stylization, biomorphism, or representation. Natural structuring or branch systems establish optimal strength-to-weight ratios. Molecular-engineered buildings are expected to be 10 percent as massive as buildings today, resulting in entirely new systems of structuring and radically different forms.

Nanotechnology will soon change industrial production by introducing labor-free manufacturing. This will directly influence our health, welfare, comfort, and prosperity. The molecular assembler breakthrough will transform our entire manufacturing process; for this, we must prepare. As with previous technological revolutions, MNT will present new ways of thinking about society and ourselves, and exact the same moral responsibilities