

**Creating Novel Islamic Geometric Ornaments by Using Parametric Design****Prof. Abu Bakr Saleh Al-Nawawi****Professor Emeritus, Department of Decoration - Faculty of Applied Arts - Helwan University**[abobakerelnawawy@gmail.com](mailto:abobakerelnawawy@gmail.com)**Assist. Prof. Dr. Yasser Ibrahim Mohammed Munji****Assistant Professor, Department of Graphic, College of Fine Arts, Helwan University, seconded Assistant Professor, Department of Art Education, College of Education, Sultan Qaboos University**[y.mostafa@squ.edu.om](mailto:y.mostafa@squ.edu.om)**Dr. Nisreen Youssef Ibrahim****Lecturer, Department of Decoration - College of Applied Arts - Helwan University**[nessreen\\_ibrahim@a-arts.helwan.edu.eg](mailto:nessreen_ibrahim@a-arts.helwan.edu.eg)**Assist. Lect. Shaima Samir Abdel Moneim Abbas****Assistant Lecturer, Department of Decoration - Higher Institute of Applied Arts - Fifth Settlement**[shaimaa\\_sameer@hotmail.com](mailto:shaimaa_sameer@hotmail.com)**Abstract**

Islamic Art was characterized by various motifs such as (floral and geometric motifs and Arabic calligraphy), but it was distinguished by the Islamic geometric ornament, which relies on geometric networks and mathematical relationships, Which helps in producing many complex geometric formations. Parametric design appeared in the last century and spread its fame and use at the beginning of this century, It is one of the most important digital technologies that spread in many contemporary architectural designs.

. Parametric techniques used to develop solutions to design problems by by using digital models with variable parameters, which produce a design that could be modified during the work and after work, by changing the parameters of the structural equations. It is also characterized by the concept of reproduction and generating networks, which we focus on in this paper. Artists and scholars were interested in Islamic motifs which were such an inspiration to them. Thus, upon the emergence of parametric design, many artists and designers found a deep connection between between the parametric techniques and the mathematical structure of the Islamic ornaments in a very complex way, without the difficulty of the traditional mathematical work. They also help them to examine new experimentations because of those variables.

the research aims to explore new contemporary design solutions for Islamic geometric motifs using parametric design, with a saving of time and effort. The researcher has experimented with making engineering designs on one of the parametric softwares (Grasshopper), and she created the structure of the basic grids in the geometric ornaments (triangular grid - hexagonal grid - square grid). She also did two experiments, the first with one variable, and the second with several parametric variations on different grids. This resulted an infinite number of new and, highly complex designs in less time and effort, by using a modern digital technical means, that can also be printed with two-dimensional printers. Thus, we can achieve civilized communication between our heritage and modern technology.

**Keywords**

Islamic Geometric Decoration, Parametric Design.