

# Application of 3D scanning in the initial stages of the design of academic symbols, with the objective of optimizing the design process using predetermined specific art details.

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**Abstract.** *The digital image is an integral part of the contemporary design process. Regardless of the method used to create the image of a conceptual idea /sketch, esquisse/. The result is a digital image, which permits manufacturing, modification and printing. In the design for academic purposes such cases are the majority. This research examines the possibilities for the specific application of 3D scanning in the design of specific complex forms with volume with an artistic character in the field of the award and memorabilia academic system. The application of these technologies noticeably decreases the time needed for design, which is key in such tasks. There is an increase in the precision of the manufacturing of the specific form, as well as a possibility for its printing and modification should the need of other projects, demanding the presence of the same object arise.*

**Keywords:** *design, projection, digitalization, PR, 3D*

## 1 Introduction

3D laser scanning techniques have been developed since the end of 1990s for 3D digital measurement and visualization in many fields including 3D design. A 3D model is a digital representation of a physical object. 3D laser scanners measure fine details and capture free-form shapes to quickly generate highly accurate point clouds. 3D models can be used for many purposes like making an animation or visualization (William R. Benner, Jr., 2016). They can be used to make design changes to make a new product.”

For the experimental examination of the application of 3D scanning in the initial stages of the design of academic symbols, insignias and hierarchical symbols it is of fundamental importance to define the potential restrictions and range of the research by creating a thorough registry of the possible applications in regard to the specific purpose.

## 2 Discussion

The digital image is an integral part of the contemporary design process. Regardless of the method used to create the image of a conceptual idea /sketch, esquisse/ in modern design the end result is a digital image, which permits manufacturing, modification and printing. (St. Fragkos, E. Tzimtzimis, D. Tzetzis, O. Dodun, P. Kyratsis, 2018). The increase in the plasticity and volume of an object leads to a proportionate increase in the complexity of its creation by way of the traditional methods. In the design for academic purposes such cases are predominant – reliefs, sculptures, medals.



**Fig 1.** Representative signs – badge and anniversary plaques <sup>1</sup>

They are an appropriate accessory denoting ones' involvement, membership or expression of sympathy towards a specific institution or community. Serving as an object of pride for people of notable contributions and academics, a memento of the time of their active work or certain activities and events.



**Fig 2.** Honorary and Memorable Signs of Medical University-Varna and Technikal University - Varna (photos and project by H. Tacheva)<sup>2</sup>

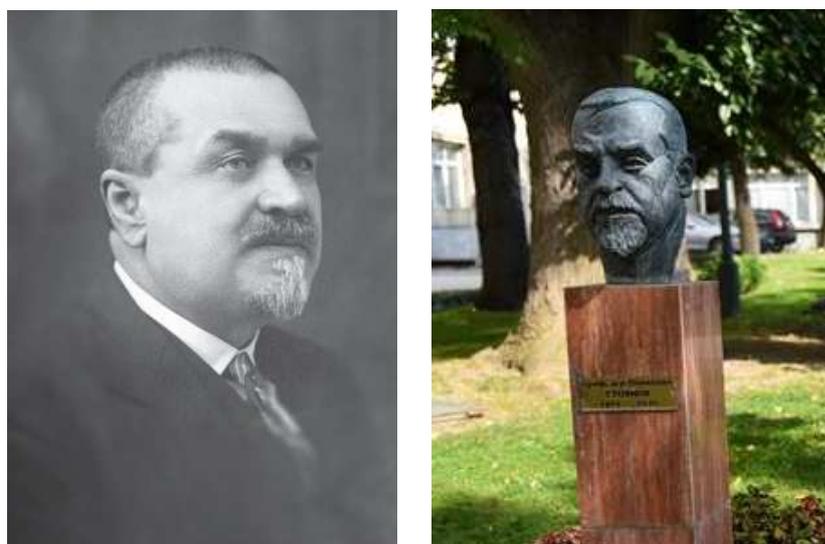
In this field, a noticeable innovation is the possibility of 3D scanning. It is an answer to the demand for rapid and detailed accurate reproduction of already existing examples mainly with volume and plasticity. The contemporary art and design process in this stage is inconceivable without a wide and constantly increasing set of ornaments, symbols, emblems, portraits etc., which makes this process so specific. In the starting stages of designing preliminary, already existing symbols and images, created in bygone times, are used and up

<sup>1</sup> Representative signs – badge and anniversary plaques <sup>1</sup>. Internet source.

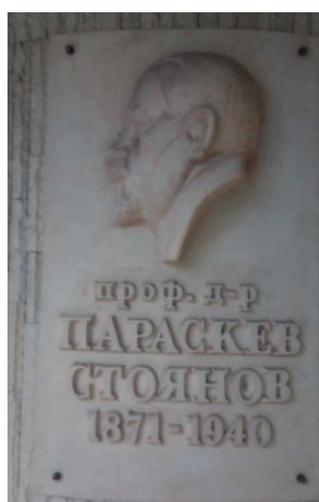
<sup>2</sup> Honorary and Memorable Signs of Medical University-Varna and Technikal University - Varna <sup>2</sup>. Personal archive.

to this stage they are not digitalized. At the same time, they can be key to the affirmation of tradition and academic succession in higher academic institutions. This in turn is of vital importance in PR strategies, which aim to instill the trust in such institutions. (Tacheva Hr., 2017) This holds especially true in the application of 3D scanning in works with texture and volume. Such methods are beginning to be widely employed in the practice of design, in the early stages of projection when the design conception is being formed and preliminary motives and elements are used in the creation of the composition. (Manor A., Fischer A., 2001). According to research, regarding the methodology of design for academic purposes 3D scanning has a main use in the following categories:

1. Plaques, anniversary plaques, awards:



**Fig 3.** Portrait and sculptural portrait of Paraskev Stoyanov <sup>3</sup>



**Fig 4.** Artistic relief of Paraskev Stoyanov from the entrance of the Medical University of Varna ( photo - Hristo Tacheva ) <sup>4</sup>

<sup>3</sup> Portrait and sculptural portrait of Paraskev Stoyanov <sup>3</sup>. Internet source.

In the creation of anniversary coins by conventional methods, complex, detailed sculpting work is needed, because coins are miniature jewelry objects. Such an example is the application of the profile of the patron of Medical University “Prof. Dr. Paraskev Stoyanov”- Varna (MU-Varna) – the eponymous professor of Medicine. A bust of his likeness is created, based on remaining photographic footage and the mastership of the Varna - based sculptor, sequentially this profile was accepted as an element of the award and memory symbolic.



**Fig 5.** Stages of work on the relief ( photo - Hristo Tacheva )<sup>5</sup>

This is the motive for the multiplication of the profile in different variations and sizes for specific projects of the register of the academic PR strategy for signs, plaques and others. The traditional method requires the creation of a preliminary sketch and the assembly of a plasticine model based on the sketch and photographs. This process proves to be exceptionally slow and work-intensive. In this case 3D scanning would have proven to be a much faster and secure way in regard to the accurate proportional transfer onto the end result (John Foley,1997; Waas M., Zell D., 2014) in comparison to the current technique that relies exclusively on the mastery of the sculptor.

<sup>4</sup>Artistic relief of P. Stoyanov<sup>4</sup>. Personal archive.

<sup>5</sup> Stages of work on the relief<sup>5</sup>. Personal archive.



**Fig 6.** Completed project and variants of the project for anniversary plaque on the occasion of 55 years of MU – Varna, author -H. Tacheva (photo-H. Tacheva)<sup>6</sup>

Art reliefs and sculptures. The technology is especially useful in the digitalization of artistic reliefs. In the case of MU-Varna these are reliefs and sculptures from antiquity such as Aesculap, Hygeia, Panacea, as well as plastic images of their attributes and symbols.

2. For graphical signs. During the transfer of 3D objects, the outlines, forms or elements of which are used for further stylization. Especially in the case of emblematic, historical or other specific images, after stylization, identical and proportional graphical images are created.

3. Commercials, PR multimedia video presentations and others. The advertising strategy of some universities includes a proper television network – as is the example in MU-Varna. The productions of the network are broadcasted in the university hospital, this increasing its reach.

4. The creations of copies of certain samples, digital reconstruction of damaged objects with the intention of their digital preservation and the future capability of their application, including design, advertising and popularizing. Such objects are of high historical or artistic values, an example from the Museum of the History of Medicine – Varna and Museum of Archaeology – Varna.

### Conclusions:

1. 3D scanning is a powerful and currently irreplaceable element of the toolkit of the graphical designer;

2. At this point there is no more accurate and detailed option for the recreation in a digital format of objects with volume and plasticity. There is a noted increase in the accuracy of the replication of the specific form, its printing is facilitated as well as the modification, should the need of similar projects, demanding the presence of the object arise.

<sup>6</sup> Completed project and variants of the project for anniversary plaque on the occasion of 55 years of MU – Varna, author -H. Tacheva <sup>6</sup>. Personal archive.

3. In the design for academic purposes 3D scanning permits the usage of any existing object, needed as a digital image in the design process. Objects with historical and artistic value (coins, tools, reliefs, symbols and signs), as well as contemporary complex tri-dimensional objects, used in the creation of plaques, anniversary coins, representative reliefs, plastic promotional products, advertising clips with 3D animations, etc. are included in this category.

4. The application of this technology noticeably decreases the time of design, which is key for the optimization of the process in such tasks. This leads to a decrease in the execution time and achieves a reduction in the cost of the design work, which increases the possibility of mass production of the specific product.

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