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Visual Effects Analysis Based on Computer Processing: Taking Rik Oostenbroek's Works as an Example †

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Abstract: More artists have come to use computer processing to create works with amazing visual effects. Rik Oostenbroek's works, his creative style, and methods are studied in this research. Born on 25 May 1989, Rik Oostenbroek is a Netherlands-based illustrator and designer. He focuses on digital art creation. His works are recreated by photography, including dynamic images and graphic design with gorgeous colors and dynamic and fluent lines. Currently living in Hilversum, Rik Oostenbroek is a self-taught Dutch freelance artist, designer, and art director working for many brands such as Apple, Nike, Epson, and Viacom. Known for his dynamic forms and unique abstract shapes, Rik is skilled in various design styles, including graphic design, typography, 3D graphics, art direction, surreal/abstract illustration, and a mixture of photo manipulation and retouching. His pioneering style is mainly based on the various patterns created by computers quickly and accurately, which attracts many imitators to follow. As this type of visual style brings greater commercial benefits and suits the visual collocation of various products, Rik's style is of research value. By summarizing Rik's works and comparing them with others, this article demonstrates the creation process and method of his work using computers and illustrates the limitations and challenges arising from those processes. Blender 3.0, a third-party free software, is used in this demonstration.

Keywords: computer processing; Rik Oostenbroek; Blender; 3D graphics; visual effect

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1. Introduction

Rik Oostenbroek has always worked as a freelancer for global brands, including Apple, Mercedes Benz, AON, Adobe, HP, AT&T, Viacom, Nike, ESPN, Wacom, Swatch, BMW, and so on [1]. Being famous for his dynamic gradient form, tons of energy, and sense of speed, Rik has previously held various posts and became proficient in various design styles. In addition to his enthusiasm for traditional photography and printing, he has also been exploring new styles based on computer processing. By facing new challenges brought by computer graphics, he expanded his vision. In this article, Rik's works are reviewed from two dimensions, including (1) the differences between the aesthetics of his works and traditional creation and (2) creation methods. At the same time, his works of the same type are recreated to display the creation process.

2. Background of Creation

According to Adobe Blog, the tireless artist, Rik, was born in 1989 and did not have a creative background until he discovered Photoshop in 2006. After that, Rik focused on jamming and coming up with abstract creations. Then, he decided on his passion and career goals when he became a freelancer in 2009. He spent at least eight hours a day discovering new things to maintain his colorful work and shape his skills, such as 3D, typography, photo manipulation, and vector illustration [2]. As seen in many of his works, he was

greatly influenced by the digital computer creation method. He could quickly complete amazing visual effects using computer software and attracted a group of online followers to imitate the same style.

3. Work Style

An important element in the visual form of Rik's work style is generally called "gradient" performance, as shown in Figure 1. It uses color as the basis to show the aesthetics. In nature, all colored lights are composed of three primary lights (red, green, and blue). Among the well-known rainbow colors (including red, orange, yellow, green, blue, indigo, and violet), red, green, and blue are the three primary colors of lights, but each color presents gradations rather than clear boundaries, which is the basic principle of gradational color expression.

Figure 1. Rik Oostenbroek often uses Silent Wave as his work's title and the gradient streamline's expression. Source: Created by Rik Oostenbroek (2022) https://rikoostenbroek.com/wallpaper-of-the-month (accessed on 23 September 2022).

Owing to the integration of gradient performance in various themes, Rik's works are beloved by customers and audiences. However, many imitators are trying to copy his style. The reason is that this type of work creates a large market, and it is not difficult to make as long as you master the characteristics of the software.

3.1. Multicolor and Organic Form

A lot of abstract expressions are mixed with realism in Rik's portfolio. Most of his works are colorful and organic. The organic shape mainly shows irregular and asymmetric objects with a certain radian on the edge. By discarding geometric and sharp expression forms, his works represent a sense of speed and vitality in a circular form of expression, as shown in Figure 2. According to Rik, his works are based on his experience of nature and his dislike of being constrained. That is why he changed from a company employee to a freelancer, which brought him greater flexibility and freedom in his creation. He tried to soak in every single experience he faced in life. It could be a simple sunset or a nice trip abroad. Overall, he said he just got inspired by things he found beautiful. Music influences his work a lot as well [2].

Figure 2. LYRS Rik fully grasped computer technology to show colorful gradient performance and smooth and irregular shapes. Source: Created by Rik Oostenbroek https://rikoostenbroek.com/lyrs, (accessed on 23 September 2022).

3.2. Limitations of Forms and Easiness to Imitate

3.2.1. Style of Rik Oostenbroek

Curved circles and rainbowlike ribbons were adopted in Rik's works to distribute on the screen, and the audience moves their eyes in the direction of the ribbons they appreciate. Rik called the series of works Arcus, and he said it took him about five years at different stages of his creative career. This series can be said to be the beginning of his success and popularity, laying a foundation for his success as a freelancer. It also encourages many young artists to learn from him and start pursuing their creative careers. Although the Arcus series is colorful and bright, it can also deliver a visual sense of motion. It brings a more intuitive feeling to artistic creation, and people focus more on the shape than the content, which is also a frequent problem in abstract painting. Rik claimed that he has been suffering from severe depression since he was 13 years old and has struggled with it, experiencing extreme ups and downs. He needed help finding the balance. However, while making the Arcus series, he gradually found a way to accept depression. From the original fight to find his uniqueness from the creation, he could accept the unique characteristics of depression, no matter how bad the situation was [1].

As revealed by the Arcus series, it is difficult for the audience to distinguish the differences between works with the change of mood. People may express their moods and relieve pressure from the process of artistic creation. At the same time, the visual effects of the final products also bring a pleasant and positive feeling. According to Rik's description, when everyone recognized the finished products and the creation process, he felt great encouragement and confidence. It can be said that the Arcus series has laid the foundation for his unique style in the future.

3.2.2. Connotations of Work to Avoid Imitation

As this series of works is easy to copy, Rik believed there is also a disadvantage to building things people like. Many imitators began to appear. However, Rik viewed these imitations from a more positive perspective. His style often inspires a new generation of creators, and some great Youtubers creatively produced a tutorial on how to make the "Oostenbroek" style.

The Arcus style is easy to imitate due to several factors. First, there is a limitation of the software. Several kinds of software can be used to make similar works, and the principle of 3D production is the same. If no new expression program languages can be developed, everyone uses existing expression production methods to make similar products. Figure 3 shows the author of this paper using the same technology to create a virtual 3D model.

Figure 3. Endless Cycle is a virtual 3D model created by the author of this paper using the same technology and different software.

Secondly, the abstract form has no connotation, and the appearance is easy to be imitated. Those with high requirements for creative technology and realistic form are naturally difficult to imitate. The only way to avoid the imitation of Arcus is to focus on the aesthetics of the shape. At the same time, specific images can be combined with the work to improve the connotations, making the audience feel the emotional resonance in addition to visual stimulation, which cannot be achieved by simple external imitation.

4. Demonstration of Creation Process

As this type of work is made by 3D software, the 3D production process must be strictly followed, from building models, selecting materials and maps, setting animation, camera adjustment, and lighting design, to the final output. Targeting the production process of Rik's Arcus series, how this series is made is revealed in this article.

The circular ring structure is the most important thing for this type of work. The 3D topological modeling function generates the model with the head and tail connected, and then the 3D software is employed to form the procedural map. Finally, the camera is used to capture the complete visual angle of the modeling and render it. The details are as follows.

4.1. Phase One: Topological Modeling

Topology is the study of the invariable properties of specific objects under a specific transformation, called continuous mapping. Mobius bands and clover knots belong to the application of topological modeling. A cup can be transformed into a doughnut after being pulled, deformed, or shrunk. This process is called continuous deformation, as the cup and the doughnut are homeomorphic [3], as shown in Figure 4. A Mobius band is one of the shapes commonly used by sculptors, and 3D software imitates these shapes to show an endless cycle of visual experience. Make Pictures full of feelings of flow and speed. It is not easy to let the vision stay in fixed places on pictures.

First, the 3D software TopMod 2.5 is applied to create the Mobius band (Möbiusband in German), a surface with only one side (surface) and one boundary, as shown in Figure 5. It was discovered independently by the German mathematicians August Ferdinand Möbius and Johann Benedict Listing as an important topological structure. We can only draw on one side if we draw a whole circle along the band on its outside or inside. A common circle can be replaced with the Mobius band due to the rotating visual effect brought by the Mobius band, which is more tensile than that of the general circle.

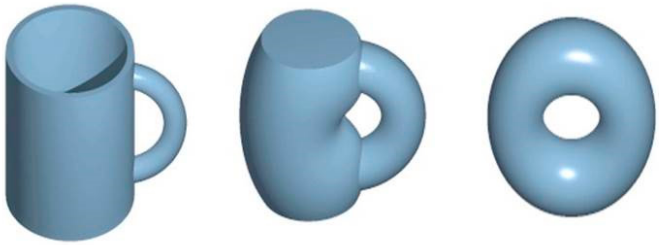

Figure 4. A bottle and a doughnut are the same in topology. Source: National Taiwan Science Education Center, CASE Journal, https://case.ntu.edu.tw/blog/?p=20714, (accessed on 10 September 2022).

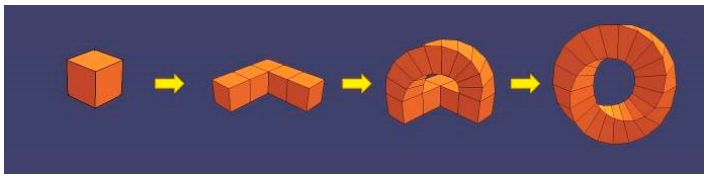

Figure 5. Create and build a Mobius band, demonstrated by the author.

After the completion of creation, the Blender software is used to modify the shape of the objects and determine the right angle of the camera position.

4.2. Phase Two: Procedural Texture

Every 3D special effect software has its own way of producing special visual effects on the surface of products, including the material and textures of objects. Except for using the setting on the Material Panel to establish materials, it creates new visual effects by cabling basic and other materials on a group of nodes after the completion of the modeling. Each node performs operations on materials to form a grid distribution, as shown in Figure 6. One node can be transferred to several nodes, or several nodes can transfer to the next node. In this way, a complicated material appearance can be realized.

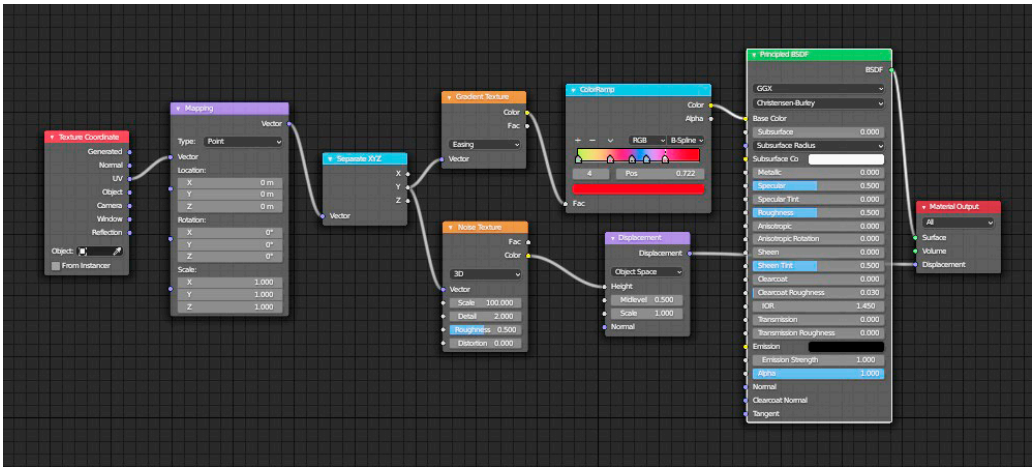

Figure 6. Nodes of E-Generation work, provided by the author.

4.2.1. Texture Node

The node makes it easier to operate textures or materials. With better control, more complex and wonderful materials can be created. When creating a node system, various data processing pipelines are described in which data "originate from" nodes of various sources and "flow through" nodes to represent different processing and filtering stages. Finally, "flow-in" indicates the output or node of the destination. Nodes can be connected in various ways, and their "attributes" or "parameters" can be adjusted to control the behavior of each node. Hence, a free combination of special effects of different materials can be generated. The operation becomes intuitive, roughly dividing the nodes into colored

and textured nodes. With these functions, the three-dimensional surface effect of objects becomes more realistic. Generally, the characteristics can be divided into physical and color texture characteristics. The use of nodes facilitates the application effect of procedural texture and improves visual effects. As the operation of traditional software uses single input, the design of nodes breaks this limitation, greatly enhancing the convenience and intuition of vision and operation.

4.2.2. Procedural Texture

The texture is a way of adding details by projecting images and patterns onto the surface. The images and patterns of projections can affect not only color but also specular reflection, transparency, and even forged 3D depth. Typically, images and patterns are projected during rendering, but texture mapping can also be applied in sculpture, painting, and deformed objects. A procedural texture is defined mathematically. It can produce a fairly stereo visual effect on the plane through computer operation, as shown in Figure 7. Compared with traditional texture mapping, procedural texture saves a lot of time. Usually, when mapping, the computer automatically combines different textures. Therefore, a few layers can be combined to produce special effects in procedural texture. However, performance limitations and random uncertainties exist in some operations, which require more tests and adjustments.

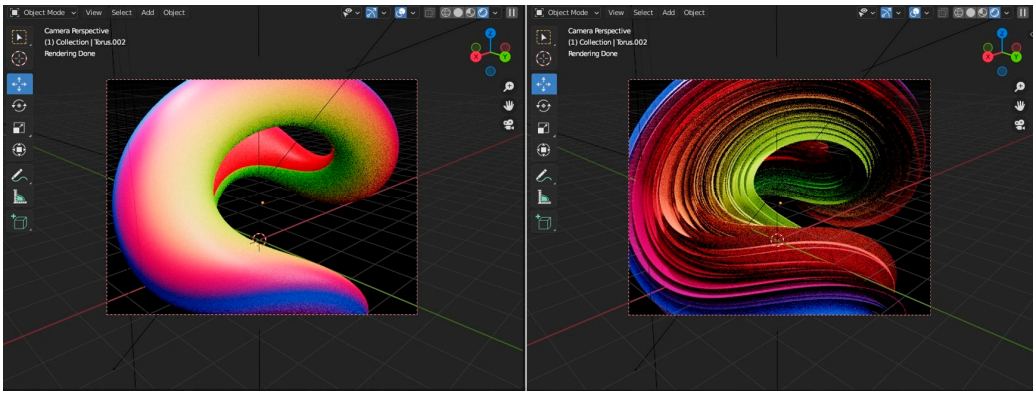

Figure 7. Procedural texture effect of E-Generation work, provided by the author.

Similar effects can also be produced without using procedural textures. However, it is necessary to have relevant shapes when making models. Limited by the changes in shapes, it takes work to form diversified changes. Moreover, it takes considerable time to make relevant shapes. Figure 8 shows traditional modeling used to create a similar effect. From the picture, the slight differences between the two different production methods are observed.

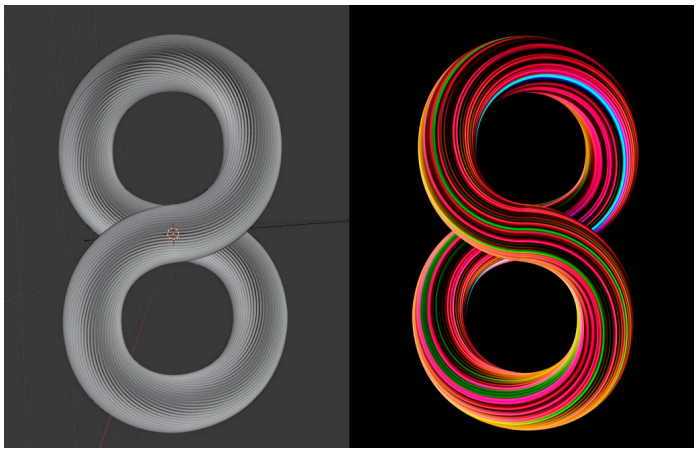

Figure 8. Traditional modeling used to produce similar effects, as demonstrated by the author.

4.3. Phase Three: Camera Position Adjustment and Lighting Design

By imitating all the functions and operation methods of real cameras, Blender Camera expands the usage of cameras. To achieve virtual 3D composite effects, VR, or 360° surround effects, Blender's photography can create a variety of visual possibilities that are not available in traditional photography. This article only demonstrates how to achieve relevant photography functions by targeting the visual effects of the Arcus series. Figure 9 shows how the Blender camera imitates the operation of a real camera.

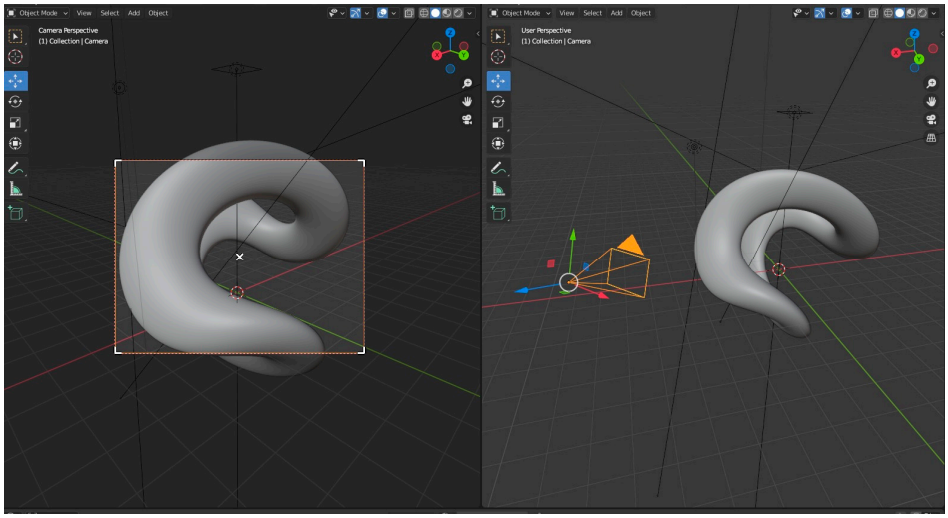

Figure 9. The Blender camera imitates operation of a real camera.

4.3.1. Camera Manipulation

Although Rik's works include dynamic films and graphic pictures, most of the Arcus series is planar. The lighting design and the camera angle adjustment follow the completion of procedural texture. For example, most Arcus-like products are generated by procedural mapping. Procedural mapping produces a three-dimensional effect of the plane, which cannot be fully mastered at the beginning. With subtle changes in the light, the three-dimensional light and shadow of the body change.

Moreover, the parameters of procedural texture are slightly adjusted to show colors. Thus, such works do not start from clear designs. Instead, they can only head towards the broad lines of body and dynamic directions. When the procedural mapping is finished, the final output can be delivered by selecting the perfect angle of the camera.

In all 3D software, a perspective window shows concrete and detailed operations. After modeling and procedural mapping are completed, the most appropriate position is found by relying on the rotation and shifting functions of the perspective windows. At this moment, similar to the camera's viewing window, a perspective window helps determine the most appropriate angle. It is different from the general operation to fine-tune and find the perfect angle with a real camera. To see the results of the final products of this camera, it must be matched with that of a perspective camera to ensure those angles are the same.

4.3.2. Lighting Design

The stereoscopic sense of most important objects is based on lights. Here, 3D lights can produce important visual effects. At the same time, the direction generated by the light source makes the picture look oriented and uniform. Blender software provides four light sources: point light, sunlight, spotlight, and regional light. Most of these works use the regional light design to make the light fall evenly on the object to illuminate every part. As shown in Figure 10, four light sources are set up to distribute the light evenly. The primary light source slants down from the top right, and a large area of refraction lies above the overall atmosphere and three-dimensional feeling. The other two regional lights are auxiliary light sources to make the body look more stereoscopic. Although the primary and

secondary light sources can be distinguished, the overall light irradiation is symmetrical. It is worth noting that the shadow generated by light changes with the adjustment of light angle and distance, and the area of shadow should be in harmony with the picture as it will also be the focus.

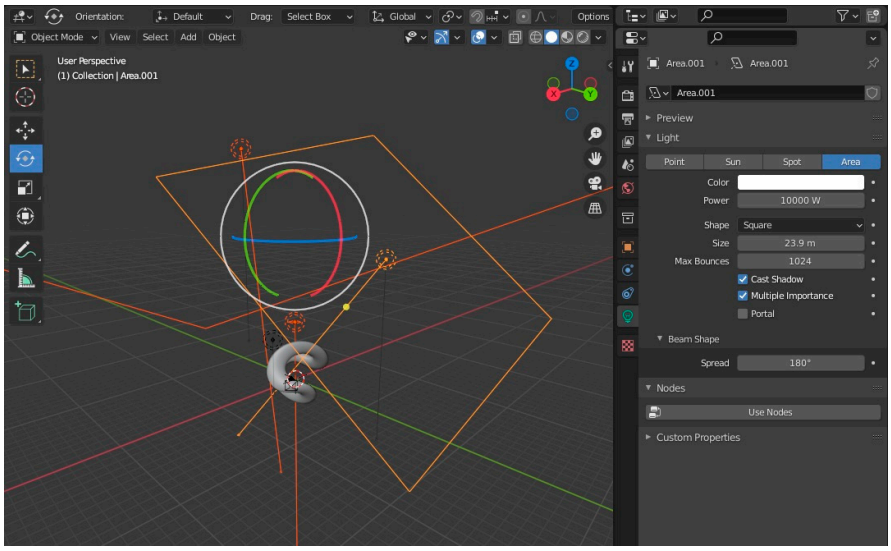

Figure 10. E-Generation set up four light sources to make the light spread evenly.

4.4. Output

Realistic visual effects are created by fully grasping the software and practicing. Several effects cannot be easily shot, so you may need to rely on computers. In addition, computers cannot achieve special effects at once. Instead, they must be tried and corrected constantly to achieve the perfect effect. After the test and adjustment, the most appropriate visual effect is selected with the light shading and camera angle adjustment. These are the details that must be paid attention to. Each step of production deserves repeated inspection. In particular, the pictures in the production process must be rendered first. View the pictures one by one and modify them gradually before you output the film to ensure the quality. Therefore, the operation is time-consuming. An effect is created consistently with Rik Oostenbroek's Arcus series using the method proposed in this article. With the help of computers, pictures that are difficult to be shot are created, such as the E-Generation (Figure 11), which shows the flowing clouds and endless visual effects.

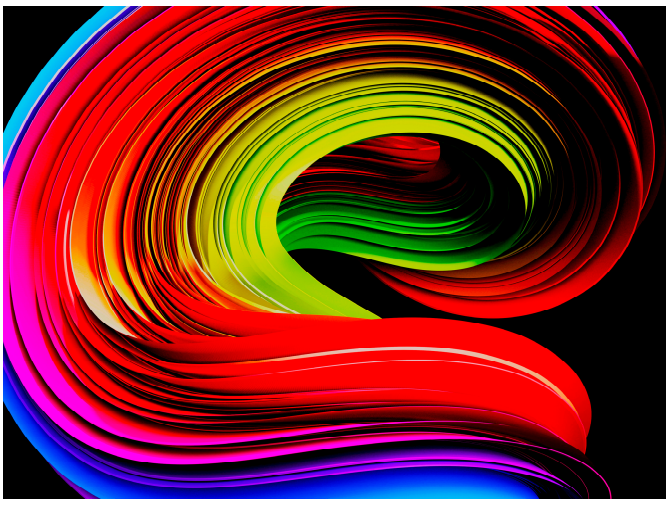

Figure 11. E-Generation creates a virtual spoondrift effect similar to the real one using the method proposed in this article.

5. Conclusions

In the future, computer special effects will bring huge commercial benefits as they fulfill various requirements that cannot be achieved by photographs. The popularization of special effect production will also be significant. The works of Rik Oostenbroek are simultaneously welcomed and imitated by everyone to bring new business opportunities. Although the technology of special effects production is limitedly revealed, personal computers can also make amazing effects. It has become a trend to create innovative effects using computers, which may gradually become a production method to greatly improve the visual effects of images. For the production company or individuals, the most important things are to cultivate a sense of aesthetics, generate more experience, and operate the software well to improve the quality of work.

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