

Beautifully Disturbing: Microcinematography and Title Design in Contemporary Fiction

David A. Kirby

More than any other discipline, the life sciences embraced motion pictures as a research tool. Tosi shows how cinema's beginnings were intimately tied to scientific research on animal movement. Pierre-Jules-César, Eadweard Muybridge and Étienne Jules Marey developed motion pictures in the 1870s as a means to study animal movement and the technology soon became a staple of scientific research (Tosi 39, 46). For biologists and medical researchers, motion pictures represented an opportunity to study "life" as opposed to learning from death (Curtis). For most of the nineteenth century the study of microscopic structures and microbes relied on fixed histological slides. With advances in tissue culturing and growing evidence for the germ theory of disease at the end of the century, biologists began asking questions about cellular functions, processes and behaviours (Landecker "Creeping"). These new questions required techniques for observing movement rather than static representations, so biologists began attaching movie cameras to microscopes. Temporality was central to rapid development of microcinematography at the beginning of the twentieth century. Scientists often combined the use of microscopes with cinematic techniques for manipulating time such as slow motion and time-lapse photography (Landecker "Microcinematography" 121-122).

The same elements that rendered microcinematography scientifically useful – extreme magnification, temporal manipulation, and the ability to reveal movement – are also what provided these films with entertainment value for lay audiences. Gunning describes early cinema's fascination with images as the "cinema of attractions." According to Gunning, the earliest filmmakers were still discovering cinema's capabilities. The technology's novelty was more important than narrative to audiences, so filmmakers focused on what they could show instead of what they could tell (382). Microcinematography, in particular, was a major source of scientific spectacle for early entertainment films (Gaycken 5). For movie audiences, scientific research films showing x-rays of a frog's leg or a virus attacking red corpuscles were no less magical than the trick cinematographic work of George Méliés. In addition, Louis Pasteur, Robert Koch and other scientists had provided convincing evidence for the germ theory of disease in the later parts of the nineteenth century. One upshot of the public acceptance of germ theory was the frightening realization that microbes were everywhere. Microcinematography allowed audiences to see this hidden microbial world, by making the invisible visible (Ostherr 2-3).

Gaycken shows that films featuring microorganisms, such as documentary film pioneer Charles Urban's *Typhoid Fever Germs* (1905), were popular because they invoked simultaneous reactions of attraction and repulsion. Audiences could marvel at the previously invisible wriggling, writhing aliens that lived around them, on them and in them. Yet, these films were also frightening because of the role these microscopic monsters played in disease. Although this story may be apocryphal, one of the first acts of film censorship involved Urban's *The Cheese Mites* (1903) where the normally invisible mites from a piece of Stilton cheese were made to look like alien invaders

when magnified on the screen. The British Cheese makers had the film censored because they were afraid it would negatively impact the public's perceptions of their product (Gaycken 30). According to Gaycken, several movie companies in the early-1900s took advantage of public fascination with microbes and specialized in producing microcinematographs for popular films (15-16). In the UK zoologist Francis Martin Duncan produced scientific films for Urban's company, while the French company Pathè supported physiologist Jean Comandon's film work and its rival Gaumont contributed to the research of Julius Ries.

Gunning notes that the appeal of cinematic spectacle was closely bound to novelty (383-384). Repetition in the use of microcinema for popular films and the public's growing familiarity with what these microscopic creatures looked like ultimately reduced audiences' astonishment at visual attractions and by the mid-1910s microcinema's novelty had faded away. The more films featured microscopic organisms as their subject, the less willing audiences were to see microcinema, in and of itself, as spectacle. Microcinema's diminishing novelty was part of filmmaking's wider shift away from movies built upon spectacle towards audience's growing desire for narrative (Gunning 385-386). Micro-cinematographic films were soon relegated to being shown at the beginning of cinema programs as the *hors d'oeuvres* before the feature films (Cahill 67). This meant that filmmakers could no longer attract audiences by merely showing microscopic images of microorganisms.

This is not to say that films of microscopic objects lost their appeal entirely. It is just that filmmakers began utilizing microcinematography for purposes other than as pure spectacle. In the 1920s and 1930s, for example, avant-garde artists and specialty theatres routinely screened microcinematographic and other scientific films for their abstract aesthetic appeal (Tsivian 82; Cahill 68). My research shows that while the novelty may have waned, microcinematography continued to be used in mainstream movies after its decline in the 1920s. . Instead of forming the basis for an entire film, these scientifically produced microscopic movies became narrative devices embedded within narrative films. As one example, microcinema frequently provided visuals for scenes featuring scientist characters looking through microscopes such as in the scientist biopic *Doctor Ehrlich's Magic Bullet* (1940), the science fiction cloning thriller *Boys From Brazil* (1978) and the zombie horror film *28 Weeks Later* (2007) (Kirby 18).



Figure 1 – Screen grab from the title sequence for seasons one and two of the television series *ReGenesis* (2004-2008). (Jennings)

Figure 1 shows another function that contemporary visual entertainment creators have found for scientific research films. In the figure you can see a still image from a standard research film of a single bacterium, *Paramecium*. The only unusual element is the presence of a mysterious name superimposed over the image: Maxim Roy. This is not the name of the scientist who discovered this bacterial species, nor is it the name of the scientist who produced the scientific film. Maxim Roy is the name of an actress who starred in the first three seasons of the Canadian medical thriller television series *ReGenesis* (2004-2008). Although this film of a *Paramecium* began its existence as a research film, it took on a second life in 2004 as part of an entertainment product. In the early-2000s title designers from Technicolor Toronto co-opted and repurposed this microscopic film along with scientific films of other bacteria, blood vessels and viruses (Figure 2) to create the TV show's opening title sequence.

In this essay I explore how title designers repurpose films of blood vessels, bacteria, viruses and other microscopic objects originally produced for scientific research and/or pedagogical purposes to create title sequences for mainstream movies and television programs; such as the one for *ReGenesis*. Despite the current technological capacity to create realistic scientific images using computer generated images (CGI), microcinematography has found favour with title designers, especially those working in the genres of horror and science fiction. Title designers' embrace of microcinematic images coincided with a wider cultural shift back towards an organic aesthetic in art and design that was happening in the late-1990s and early-2000s. In art and design the organic aesthetic style was characterized by an emphasis on flowing forms, curves, and natural shapes that evoked a sense of organic beauty (Pearson 8-9). Artists and designers were inspired by natural and organic forms. They began using shapes, textures and objects found in the natural world to create designs that were in harmony with the environment. Some artists, however, were inspired by humanity's growing ability to manipulate the natural world through rapid advances in biotechnology and genetic engineering. For bioartists, the organic aesthetic involved embracing the chaotic and random elements of the natural world (Byerley and Chong). Title designers at the turn of the millennium were influenced by both the organic aesthetic movement's focus on the balance of nature and the biological chaos expressed in BioArt.

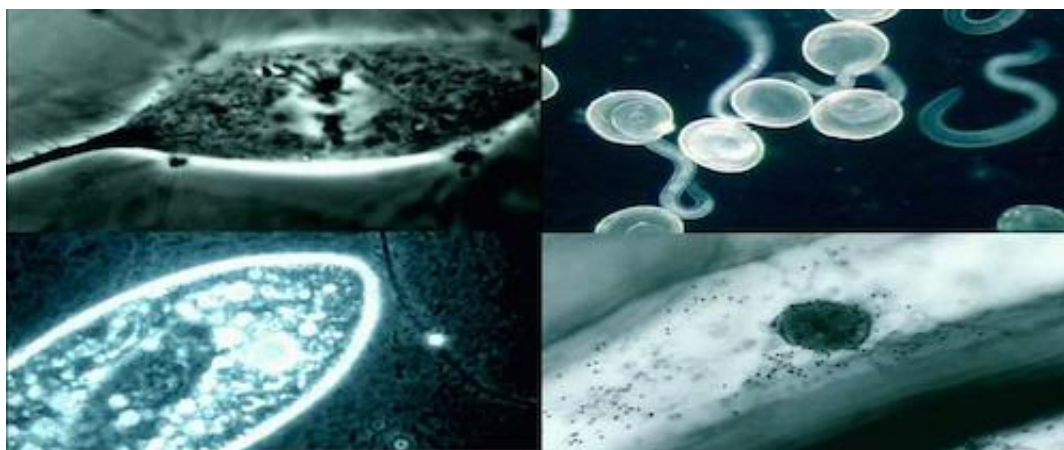


Figure 2 – Screen grabs showing the variety of microscopic films used in the title sequence for seasons one and two of *ReGenesis*. (Jennings)

History of Title Sequences

The evolution of the title sequence provides some context explaining the influences behind contemporary title design and designers’ uses of microcinema. Until recently, opening and closing title sequences have received scant attention from the film studies community; much of the scholarly work done on title sequences has emanated from design historians. But, these scholars have tended to treat title sequences as an exercise in motion design graphics rather than as an integral component of a film narrative. As Emily King notes, “While those engaged in film studies have for the most part ignored title sequences, historians of graphic design tend to treat them purely as graphics which through cinema technology have taken on a temporal dimension.” (*Taking Credit*) Recently, though, scholars across disciplines have taken title sequences as a serious object of study. Whether they are considered an integral component of a film’s narrative or a transition zone distinct from the main film, title sequences serve several aesthetic and entertainment functions including establishing genre, developing a specific tone, foreshadowing thematic content, providing diegetic information and influencing an audience’s emotional state (Stanitzek 46).

Film and design historians generally split the history of title sequences into five broad periods: silent cinema (1900-1929), Pre-Saul Bass (1930-1955), Post-Saul Bass (1955-1974), Title Minimalism (1975-1994) and Post-Kyle Cooper (1995-present) (Allison “Promises” 111; May). Although they evolved a bit during the earlier periods, title sequences were still primarily considered vehicles for providing production information and signifying a movie’s tone and genre until the early-1950s. Allison details how several outsiders to the Hollywood studio system began to experiment with the title sequence in the 1950s, and they transformed it from a pragmatic means of communication into a distinct art form (*Saul Bass*). Most prominent amongst the new category of “title designer” was Saul Bass whose groundbreaking animated title sequences for the films of directors Alfred Hitchcock and Otto Preminger resulted in a title design revolution in the late-1950s and early-1960s. Bass conceived of title sequences as simultaneously serving as a form of product branding and as a means to introduce the narrative in a metaphorical manner. Bass explored the potential of storytelling within the opening credits by using innovative techniques such as live

action, typography in motion, animation, montage, and visual effects. Allison notes a trend soon developed during this period in which titles became increasingly complex and they began extending into the main narrative action, thus collapsing the boundaries between diegetic and non-diegetic spaces (*Novelty*).

By the end of the 1970s title sequences had reverted to primarily being information delivery systems (May). But, in the mid-1980s changes to the funding systems for film productions resulted in a renewed desire for more interesting and entertaining title sequences. At this time single studios could no longer finance entire productions on their own. They now required capital funding from multiple companies. Given their significant financial expenditures, these companies were not content with a credit at the end of the movie. Instead, they wanted their names and logos to be prominently featured at the beginning of the picture. The increasing length of the opening credits again provided an opportunity for a new generation of title designers to experiment with this cinematic component (Allison, *Saul Bass #*). The title design work of Bass and other pioneers was a significant influence on these younger designers who bought into Bass's notion that title sequences could be an integral part of a film's narrative while concurrently existing as independent works of art. The increasing sophistication of computer graphics and motion design also encouraged these emerging title designers to experiment with styles that would not have been achievable in Bass's day.

In the same way that film historians single out Saul Bass's title for the film noir *The Man with the Golden Arm* (1955) as launching the previous Golden Age of movie titles, design historians point to Kyle Cooper's sequence for the horror-tinged crime thriller *Se7en* (1995) as the origin for revitalized interest in title sequences (Allison, *Novelty #*). Cooper's work was revolutionary in that he not only incorporated trends in print, advertising, and music industry graphics into his work, but he also combined images obtained through magnification with new digital animation technologies. *New York Times Magazine* named *Se7en's* sequence one of the most important design innovations of the 1990s (Muschamp 61). The sequence's style spawned imitators and sparked a renaissance in movie title design. Renewed interest in opening credits also affected title design in other media including television and computer games. The perception of title sequences as a unique art form has led to a new cohort of celebrity title designer including Cooper, Danny Yount, Garson Yu, Pamela Green and Henry Hobson as well as websites devoted to title sequences such as "Art of the Title" and "Forget the Film, Watch the Titles."

The Authenticity of Controlled Randomness

Title designers' employment of microcinema is a distinctly post-CGI phenomenon, appearing well after the establishment of CGI technologies in the mid-1990s. There are certainly some mundane reasons for choosing technologies of magnification over digital animation to create microscopic images on screen. Microcinematography is a cheaper alternative to CGI and the technique is far less time consuming. But modern title designers are mostly choosing to use real films of microscopic objects for reasons that have nothing to do with cost or effort. One prominent motive is that films of microscopic organisms involve elements of randomness and imperfections that title designers believe cannot be easily simulated with computer technology. For example, title designer Henry Hobson feels that:

CGI never offers the imperfections of reality. You know if you walk down the street and you're looking at a pavement, they're not all perfect. They're pockmarked and stained in different ways from any other pavement around the world. Whereas if you create something in CG, it comes at it from a mathematical, technological point of view built around perfection. That is what draws me to using these microscopic organisms. They provide the imperfections of reality.¹

Films of microscopic objects provide title designers a sense of naturalness that cannot be reproduced through the artificial technology of CGI.

There are certainly times when title designers decide to use CGI over real microcinematographic films. CGI has utility in rendering scientific and medical views that could never have been achieved with microcinematography such as the famous opening sequence of *Fight Club* (1999) in which the camera appears to move through the protagonist's brain (Kelty and Landecker). The main benefit of CGI is that it allows title designers to control every aspect of images that would otherwise be subject to the randomness of reality. Kyle Cooper's use of CGI to create microscopic biological images for the titles in the comic book film *Spider-Man* (2002) was an exception to his usual embrace of microcinema. But, in this instance CGI allowed him to maintain control over the movement and aesthetics of the organic elements in the film.² However, this total control becomes a problem when CGI is used to create images of living organisms or biological systems. While CGI can create views of microorganisms or the inside of our bodies that may look realistic, it is almost impossible to get those effects to look completely natural or organic. The need for an organic aesthetic is why Robert Pilchowski chose to use microcinema for the science fiction horror film *Existenz*'s (1999) title sequence instead of CGI.³ According to Pilchowski, the film's director David Cronenberg "didn't want something that looked very slick and techy. He wanted something that always felt very organic and natural."

Although computers can simulate pseudo-randomness the technology is not capable of generating true randomness. CGI's inability to capture the randomness of nature led Pamela Green and Jarik Van Sluijs of the PIC Agency to include microcinema in several title sequences including those for the comedy action film *Van Helsing* (2004) and the supernatural mystery TV series *Haunting Melissa* (2013) because "there is randomness to real-life that cannot be reproduced in a computer. You're getting something organic by shooting real objects that you just cannot replicate in a computer."⁴ According to Cooper, a science film is unscripted and the microbes could be doing anything. It is as if nature has been captured and reflected as randomness. Living organisms do not behave in ways that can be dictated by the filmmakers and this can lead to unpredictability in their movements. For Peter Anderson, who created titles for the TV series *Sherlock* (2010) and the police

¹ All information and quotes regarding **Henry Hobson** in this essay come **from** an interview with David A. Kirby, 19 March 2018.

² Unless otherwise noted, all information and quotes regarding **Kyle Cooper** in this essay come **from** an interview with David A. Kirby, 1 July 2014.

³ All information and quotes regarding **Robert Pilchowski** in this essay come **from** an interview with David A. Kirby, 30 March 2018.

⁴ All information and quotes regarding **Pamela Green and Jarik Van Sluijs** in this essay come **from** an interview with David A. Kirby, 12 March 2018.

procedural parody *A Touch of Cloth* (2012), this unpredictability has artistic value for the designer because he believes that "movement has an aesthetic."⁵

The title designers I interviewed all felt that that biological images created with CGI have a vestigial artificiality no matter how strong the processing power of the software. Cooper found CGI's artificiality to be acceptable for *Spider-Man* because that aesthetic complemented the comic book origins of the story. In several cases designers started with CGI before realizing that these simulations were not appropriate for their sequences. Van Sluijs and Green, for example, began using CGI to create microscopic images for the title sequence in the epidemic-themed horror film *The Cabin in the Woods* (2012). However, the CGI did not convey significant naturalness and they resorted to filming real biological objects:

In that case, we were going to use CGI because it was going to give us, supposedly, more control. We started off doing it on the computer and it just didn't come out right. It just looked... it just looked CG. It looked good but it looked CG.

Total design control may be one of the primary reasons for choosing CGI over microcinema, but it is useless for designers if they aren't satisfied with the aesthetic. There are also ways for title designers to exert some control over the randomness of nature. The randomness of microcinema may generate different films every time, but the designer can still choose which of these random films best fits their artistic vision. Additionally, since these are living organisms, the designer can alter their environments in ways that impose some control over their randomness. Henry Hobson and Kevin Joelson, for example, used time lapse to film slime moulds and fungal spores growing under a microscope to create the titles for the zombie horror computer game *The Last of Us* (2013). According to Joelson, they had pitched an idea to the game designers called "Beautifully Infected" that was "all about capturing the beauty of the growth" (Perkins). The game's producer liked the idea but told them, "it has to be grungy." Hobson said that they initially planned on using computer graphics but that they felt their first images were "not real enough but a little more photographically CG looking" (Perkins).

⁵ All information and quotes regarding **Peter Anderson** in this essay come **from** an interview with David A. Kirby, 4 March 2018.



Figure 3 – The designers could not control the ways that their slime moulds grew. But they needed to make sure they had spaces to add typography. So they used various physical and chemical methods to influence the growth of these organisms. (screen grab from *Last of Us*)

Given that they were producing a title sequence for a computer game, the visuals’ artificial CGI look should not have been a problem. But the designers were not able to use the game’s render engine. This meant that their sequence would not match the aesthetic of the game’s visuals whether it was CGI or not. They then decided that they could best achieve the desired grungy appearance by using real organisms and microcinema. While they wanted the unpredictability of living organisms, they also wanted some degree of control over these images because they needed blank spaces to add typography (Figure 3). To control the randomness, Hobson used various methods such as freezing or applying chemicals to portions of the glass substrate to influence the directions of the organisms’ growth. This kind of controlled randomness that title designers impose on microorganisms is similar to the notion of animal wrangling for films. Animals on a set may be trained but they are still animals that can act in unpredictable ways. The goal of the animal wrangler is to retain this unpredictability while making sure that the animals act in the desired direction. The same is true with the use of microcinema.

Bacterial Body Doubles and Naturalism on Screen

One of the keys to the naturalism of live-action shots of microorganisms or the interior of our bodies is that they include the imperfections inherent to the natural world. According to Danny Yount from Prologue Films, “imperfections are exactly what drives everything to look like an organic form. The problem with CG is that everything is so perfect and manufactured. Even the imperfections we code into our CG look too perfect.”⁶ Henry Hobson conveyed a similar notion by claiming, “CGI never offers the

⁶ All information and quotes regarding **Danny Yount** in this essay come **from** an interview with David A. Kirby, 30 June 2014.

imperfections of reality." The natural flaws in microcinema are what Cooper calls "perfect imperfections" because they are unquestionable signifiers that the objects on the screen are real rather than artificial. Naturalness is important in title sequences because it helps the audiences to buy into the subsequent fictional story. For Jarik Van Sluijs real scientific films can "make the ridiculous sound somewhat possible. By intertwining the fantastic with imageries that people know as being real, that they recognise as real or can tell that it's not, you know, something fake we help smooth the way for the story to come."

Microcinema's naturalistic and organic appearance is more important to title designers than the idea that these films correspond to a particular reality. That is, it is only crucial that the microcinematographic films used in title sequences involve living objects from the real world and that these films are aesthetically suitable. There are instances when a designer wants the naturalism of microcinema but cannot obtain scientific films of a particular microscopic object or the object that is most appropriate for a title sequence does not provide the right aesthetics. Since these designers were not able to adequately mimic naturalism using CGI, they instead use one living object as a stand-in for another living object. In these cases, title designers are essentially using real-world microorganisms as body doubles for other real-world or fictional microorganisms.

The microcinematic films in the title sequence for *ReGenesis* are meant to convey an impression about the potential dangers of the biological (Figure 2). In other cases, a film might be about a specific object, but scientific films of that object are unobtainable or do not meet the designer's artistic vision. Van Sluijs and Pamela Green's inability to procure real time-lapse films of veins growing inside a human brain forced them to come up with an alternative way to portray this for their title sequence in *Haunting Melissa*:

The veins inside her head are live shot material. Of course, we couldn't shoot real veins. What we did was we found a plant with roots that looked the closest to veins. We washed the soil off and basically shot that microscopically and colour-corrected it red.

Using one natural object to mimic another natural object relies on a belief that audiences will not recognize that the object on the screen is not the actual object. For many designers this assumption justifies their approach of only judging the artistic value, and not the scientific relevance, of microcinematographic films.

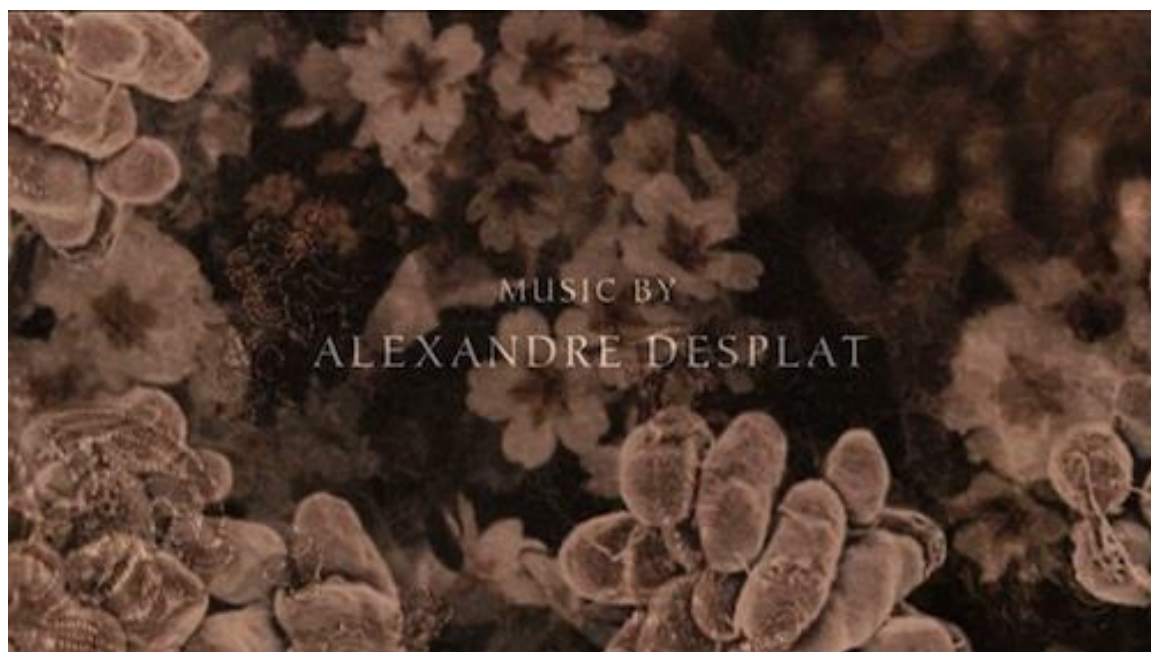


Figure 4 – For Kyle Cooper the visual relationship between flowers, bacteria and fabrics in the title sequence for *The Painted Veil* overrode any concerns about scientific accuracy. (screen grab from Curran)

In most cases, title designers do not even bother looking for scientific films that match the organism or biological structure within their film’s narrative. The dramatic film *The Painted Veil* (2006) involves a cholera epidemic in China; Cooper wanted his title sequence for the film to convey the similarities between flowers, films of bacteria and Chinese motifs on fabrics (Figure 4). Cooper considered the notion that the bacteria in the sequence should actually be cholera cells to be irrelevant:

Look I don’t know if those cells in *The Painted Veil* are cholera cells. I think they might be disease cells. But I thought they were beautiful. It might not be scientifically accurate but I still liked how it looked with the flowers and fabrics so I used it.

Even more so than the filmmakers creating the main film, title designers are privileging the aesthetic over any other concerns. They see their role as being one in which they are trying to establish an atmosphere or theme for the coming narrative. From their perspective concerns about the scientific authenticity of the object do not help them achieve these goals.

Not every designer I spoke with was comfortable with this approach. Eric Keller trained as a scientific illustrator⁷ and has worked on several title sequences including his collaboration with Yount for the end sequence in the science fiction horror film *The Invasion* (2007). He felt that misrepresenting scientific films in this way was a misuse of science and detrimental to the public’s scientific literacy. For *The Invasion*, Yount wanted a sequence mirroring the film’s plot of biological invasion from outer space. His sequence would start with galactic images and then move into the human body with

⁷ All information and quotes regarding **Eric Keller** in this essay come **from** an interview with David A. Kirby, 9 April 2018.

images involving infection or genetic mutation. Keller put together a collection of suitable films involving real infectious microorganisms, human proteins and DNA replication for Yount and his team to consider. But Yount and his team immediately rejected all of these images, “They just looked at my collection and they had no idea what they were looking at. They’re just like, ‘That doesn’t look interesting at all. We want something that looks cool.’” Yount then assembled his own collection of films that had the aesthetic qualities he was looking for, but most of these films had nothing to do with infection or mutation including films of non-infectious bacteria, plant cells and fungi (Figure 5).



Figure 5 – Danny Yount used real scientific films as the foundation for the microscopic CG images in the end sequence to *The Invasion* because he wanted to significantly alter the images but maintain a sense of randomness. (screen grab from Hirschbiegel)

Keller said that at one point the team “gave me a film and said do something with this little tentacle jumping out of this cell.” When Keller told them that this was footage of a sperm entering an egg, they told him it did not matter because they liked the way it looked. Overall, he considered his collaboration on *The Invasion* to be disappointing and that he may have been complicit in communicating inaccurate ideas about the nature of infection:

I had fun trying to come up with appropriate images for inside the human body, but [the sequence] doesn’t look like anything like that. I’m a little bit afraid that if people actually think microbes have that easy a job getting into a cell you can be in real trouble, you know? So I just made up stuff because that’s what I was paid to do. It would have been nice to have it a little bit more accurate.

Yount, for his part, believed that Keller was not bothered by these deceptions, “It was refreshing to me hear that he was okay with the work, because then I didn’t feel like I

had to be so rigid. We could just have fun. And that is all we are doing. We are painting a picture, communicating an idea and the audience gets it.” For Yount, the title sequence was not a scientific document; it was an entertainment product. From his perspective any images that conveyed the theme of biological invasion were the appropriate images.

Juxtaposition and the Horror of Scientific Research



Figure 6 – Films of a bacterial spore pod bursting and cellular replication are juxtaposed with “chaos footage” of explosions and riots in this screen grab from *Dawn of the Dead*. (Snyder)

Title sequences are about the juxtaposition of images and a fusion of styles, techniques and images. Similar to the technique of montage, designers often use graphic match cuts or match-on action cuts to imply connections between successive images and to create new meanings based on this juxtaposition. For the supernatural horror thriller *The Reaping* (2007), Yount used match cuts of microscopic images of plants, insects and fish to convey the idea that all things are connected, especially when magnified. Cooper intercut microscopic films of cells with what he called “chaos footage” (breaking glass, riots, explosions etc.) to show the formal similarities between the internal cellular violence and the external chaos that would result from a zombie outbreak in the zombie horror film *Dawn of the Dead* (2004) (Figure 6). Juxtaposition plays a major role in designers’ use of microcinematographs. Title designers’ use of microcinematographic films is both an overt rejection of hyperrealist CGI technologies and a supplement to these technologies by providing juxtaposition between the real and the unreal. Pamela Green and Jarik Van Sluijs find microcinematographic films useful in creating a fusion aesthetic such as the juxtaposition of the biological, exotic and artificial in their title design for the cloning-based horror film *Godsend* (2006).

Title designers believe that opening title sequences should establish the themes of a film and, if necessary, can also serve as backstory or provide missing scenes. According to Garson Yu, microcinematographic films in the title sequence of *Hulk* (2003) served both functions (Ulloa & Albinson). First, these images were crucial in providing complex information for the film’s backstory without voiceover. They helped explain to the audience how mad scientist David Banner’s genetic fusion experiments ultimately turned his son into the Hulk. Second, Yu used microscopic films

metaphorically to establish the film's themes of microscopic changes having impacts at a macro level. Yu felt that microcinema was a means to "compare a microscopic world to the larger universe in outer space" (Ulloa and Albinson). So, for his first shot he paired a film of a cell about to replicate with animation of the galaxy (Figure 7). The title sequence provides backstory for the creation of the Hulk, and the science films function as they do within the narrative, but they also take on greater symbolic meaning by being juxtaposed with other images.

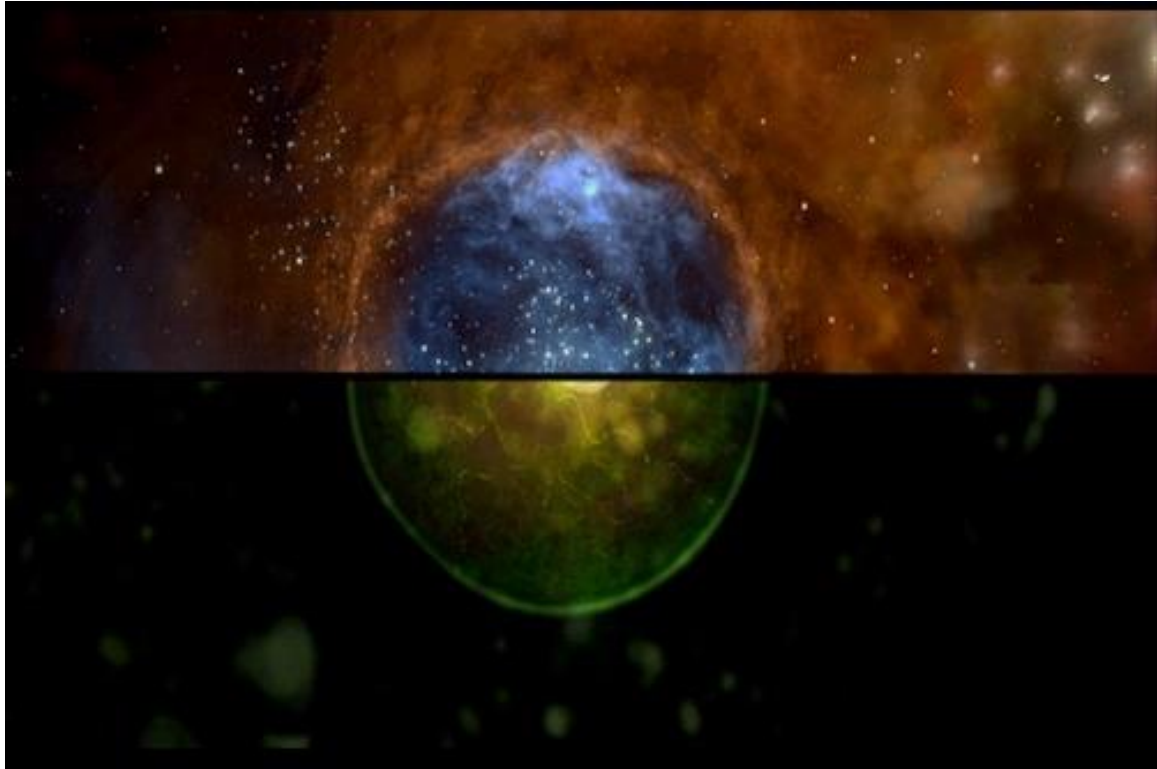


Figure 7 – The title sequence for *Hulk* fuses microcinematography of a cell about to replicate with animation of the universe as means of contrasting the microscopic with the massive. (screen grab from Lee)

Cooper prefers working on title sequences that encapsulate the main character's obsession, such as the titles he created for *The Incredible Hulk* (2008). He finds that close-ups are an effective way to suggest these obsessions and he considers macro- and microcinema an extreme version of the close-up. Peter Anderson also considers magnification an important mechanism for title sequences to establish the underlying themes of a film or TV series. For him microscopic magnification can turn everyday objects into abstract images that are unrecognizable to the audience. His title sequence for the crime thriller *The Shadow Line* (2011) evolves over the course of the TV series. The first episode's title sequence features extreme magnification and each subsequent episode involves progressively less magnification until the final episode clearly reveals the magnified object to be the jacket of the person who has been shot. The original magnification disorients the audience, but the increasing clarity of the images in each subsequent episode asks the audience to look more deeply at the details of the murder and the motives of the people trying to solve the case as the audience comes closer to the full story.

A specific and frequently used form of juxtaposition is the pairing of microcinematographs with images of horror. Title designers routinely use microcinema to signify the horror of scientific research as in as in the opening credits of *The Island of Dr. Moreau* (1996), *Godsend*, *The Last of Us* and *Dawn of the Dead*. Much of the horror comes from the public's unfamiliarity with microscopic images. Yount believes that because most people do not travel to what he calls "science country," meaning they are not looking through microscopes or reading scientific journals, they fear these scientific images of foreign beings writhing about on the screen. But the horror of these images also emanates from the public's familiarity with the idea that microorganisms can cause infectious diseases. Henry Hobson finds that the phobia of infection makes microcinema useful in establishing a film's atmosphere without having to use images from the main narrative:

When we're working on a film that's dealing with a medical issue, contagion, infection, and the kind of zombie, werewolf genre, someone will want something which doesn't give any imagery away from the film but gives you that right mood and tone and pacing. Images of bacteria, molecular structural shifts, blood or whatever nicely serve that purpose.

Audiences fear this hidden microscopic world, but they also find these organisms and microscopic structures fascinating. Microcinema provokes the same feelings of attraction and repulsion in modern audiences that Gunning found had occurred with early cinema audiences. The inclusion of microcinema out of context and the juxtaposition of these films with other images heighten their repulsiveness in horror film titles.



Figure 8 – Films of veins in an eye are juxtaposed with streets on a map to symbolize changes both genetic and personal in *The Incredible Hulk*. (screen grab from Leterrier)

By being unfamiliar but organic and visceral, these microscopic images convey a sense that transformation through scientific research brings chaos and violence to the internal world of our bodies. Cooper finds that microorganisms effectively represent the genetic violence that is being done to a person’s DNA and, thus, to their identity in these films: Part of the [*Incredible Hulk*’s] backstory was that there is a bodily change that goes on. So there was a bodily change that goes on at a cellular level in the [*Incredible*] *Hulk*, in *The Painted Veil*, *Dawn of the Dead*, in *Spider-Man* and *The Island of Dr. Moreau*. There is a theme in these stories of transformation and metamorphosis on a micro level. The opening title in *The Incredible Hulk*, for example, utilizes films of veins from an eye that appear to morph into streets on a map to symbolize the changes in Bruce Banner’s physiology as he turns into the Hulk but also the changes in his personal life as he is forced to run away (Figure 8).

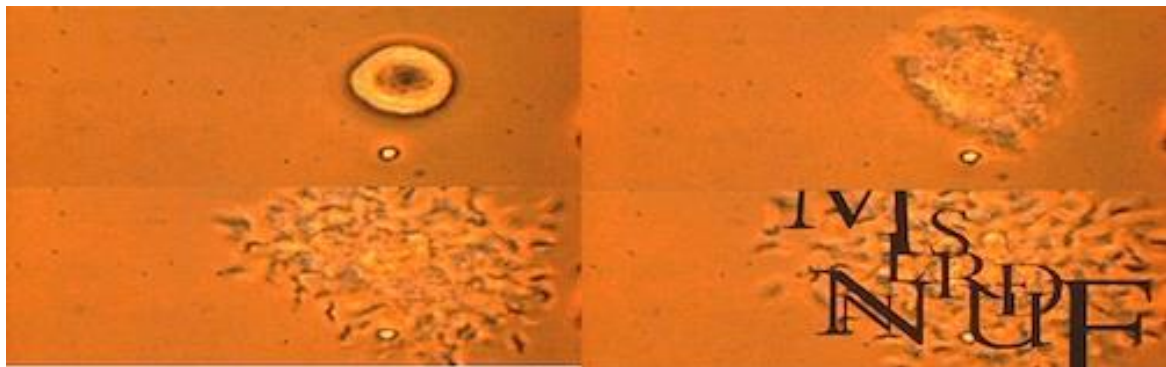


Figure 9 – Scientific films such as this one of an infected bacterial cell bursting with phage are meant to signify the concept of “genetic violence” in the title sequence for *The Island of Dr. Moreau*. (screen grab from Frankenheimer)

For one of his most famous title sequences, Cooper used microscopic films of mammalian eyes, bacteria bursting with phage, blood flow through capillaries, *Daphnia* parthenogenesis and cellular mitosis, among other microcinematographs, for the title sequence to *The Island of Dr. Moreau* (1996) as a way of representing the cellular warfare involved in genetic engineering (Figure 9). Design critic Andrea Codrington perfectly sums up how this juxtaposition of microscopic images created the desired unsettling effect, “The viewer first enters the title sequence through the irises of various animals, and then the rumbling begins: cells collide and mutate, microscopic beasts duke it out like prize fighters, blood courses through veins with hot urgency” (12). The rapid movement of the organisms and cells in the scientific films combined with rapid editing conveys an illusion of organic violence that is appropriate for the tale of scientific malfeasance to come.

Scientific Ways of Seeing Nature and God’s Creation

Microcinematographs often symbolize scientific ways of seeing in title sequences. Peter Anderson considered the use of microcinematography in his title sequence for *Sherlock* as a way of allowing the audience to “be Sherlock for thirty seconds” and to see the world from his perspective. The sequence demonstrates how Sherlock acts like a human microscope. Microcinema was a way to “get inside Sherlock’s brain”:

He sees people as tiny little ants in the distance but he sees micro little details at a macro scale. Just for that moment you become him. So he did not just see a little bit of blood on the collar, he saw that that blood was made out of cells because he has this heightened character.

Other designers use films of microbes to critique the notion that answers to questions about nature will be revealed if only we can get closer and closer to the objects of study. The end sequence of the film *The Reaping* plays with this theme and uses microcinema of frogs, leaves and flies to metaphorically recapitulate the tone of the film (Figure 10). The film is about the seven biblical plagues and one scientist’s inability to find a rational answer for these occurrences. According to Danny Yount, “*The Reaping* was centred around biblical plagues so I thought it might be good to show what scientists look at when they peer through a microscope and are trying to understand the things that are occurring doing their own research.” But, he says, the inability to find the answers in that microscope merely renders these microscopic images as a creepy visual language that heightens our fear of the unknown.



Figure 10 – The progressive magnification of a leaf in *The Reaping* is meant to signal “scientific ways of seeing” in a story where science fails to solve a supernatural mystery. (screen grab from Hopkins)

That we cannot always find answers in a microscope also points to an unusual reason for Yount’s and Kyle Cooper’s use of microcinematographs. It is not just for aesthetic reasons that these two title designers have embraced micro-cinematography. They also use micro-cinematographs because these scientific films mesh with their religious identity as Christians. By using these films, they facilitate and show their appreciation of God’s creation, which includes microbes. According to Cooper:

Personally, I am very enamoured with creation. I call it creation in the sense that, we don’t have to have a theistic discussion here, but I prefer the beauty of God-made things versus man-made things. I think it is very interesting to observe naturalistic cellular things, the things that happen in real life are more beautiful than artificially in a CG situation.

Cooper and Young embrace films of bacteria because the randomness of these films matches their beliefs about the importance of imperfections in God's creation. This is not to say that they believe they should never use CGI to create visuals. In fact, they believe that one of God's gifts to humanity is the ability to create works of art using technologies including CGI. But, they both feel that it is arrogant to create flawless visuals of the natural world using CGI because it is an assertion that humanity can create biological images better than God.

Cooper believes that microcinema shows us how God even made the creatures invisible to our eyes complex and beautiful. Cooper's thoughts about the spiritual nature of microscopic images are reminiscent of writings in the 17th and 18th centuries about the microscope as an instrument that cultivated a sense of wonder (Doron). These early microscopists marvelled at God's attention to the smallest details of creation, which were not even detectable by humans without technological means. They also expressed wonder at humanity's ability to use this technology to attain the wisdom and knowledge of God. Historian Claude-Olivier Doron argues that microscopists did not just consider the act of looking through a microscope to be a spiritual experience; they also believed that the action was a transformative exercise that led to "an inner transformation of the observer" (Doron 180). In the same way, Cooper is arguing that films of microbes could lead to a spiritual awakening in audiences by promoting humility and celebrating of God's wisdom in each element of the world.

For Cooper and Yount, the complexity of microorganisms makes them beautiful, but it also renders them frightening. Yount considers this combination of being creepy and beautiful to be important:

Personally, I am a believer of God and of Christ and I look at the universe that He had made, even darkness, and I do not think God sees those things as dark and horrifying. I think we interpret them that way just because it is not part of our daily surrounding. But we can demystify them as well, show people how beautiful God's creation is.

Yount also discussed the notion that he appreciates the fact that as a designer he also serves as a creator; that he can use God's creations to create his own art. I find it intriguing that in both instances when these title designers began to tell me about their religious beliefs and how it impacts their filmmaking they started with the word "personally." These are personal religious beliefs that include scientific images, but as designers they have the capability of turning those personal beliefs into art that can be seen by millions of people.

Conclusions

Rather than utilize one of the most advanced animation technologies ever invented, title designers are frequently choosing to employ a nondigital magnification technique developed during the earliest days of cinema to capture microscopic images. CGI may offer designers total control over their images, but that control requires the designer to meticulously plan each image, which can make CGI-generated microscopic images look over-designed. This means that while CGI can generate views of microorganisms or inside our bodies that may look acceptably realistic, it is extremely difficult to create effects that look natural or organic. I find in my research that designers prefer microcinematographic films because they desire the randomness and imperfections that

accompany the filming of living organisms and real-world objects. The randomness of microorganisms is one of the ways designers can maintain a sense of authenticity that is difficult to achieve with CGI. Title designers have also developed techniques to influence the randomness of microcinema, which allows them to retain some artistic control over these images. Microcinema is not a replacement for CGI in title design. It is another tool that designers employ alongside other visualization techniques. In fact, they often contrast live images of microorganisms alongside CGI images in order to create a fusion aesthetic between the biological and the artificial.

Designers create new meanings for scientific images by juxtaposing them with other cultural images, which are communicated to audiences through an entertainment medium. This is especially true for title designers working on films in the genres of horror or science fiction. Microcinema serves as a quick signifier of the unseen. Microcinema features natural objects, but the process of using them to create entertainment products adds an unreality that makes their microscopic subjects seem both beautiful and disturbing. Unfamiliarity contributes to the frightening nature of microbes. The microscopic is a hidden world, and many audiences have never looked under a microscope or have not looked under one since they were young. But magnification of these alien-looking organisms adds to their fearsomeness. In title sequences microbes often symbolize the internal transformations and metamorphoses occurring in horror films due to scientific experimentation. The rapid and sudden movements of these microscopic creatures and biological structures signify the chaos and cellular violence that the public believes must accompany biological changes.

Designers primarily choose to use microcinema over CGI when their goal is to create an authentic organic aesthetic. For title designers there is often no need for the living objects in the films they choose to bear any relationship to the specific organisms or biological structures they portray in the sequence. There are times when they just require scientific movies involving objects that are recognizably living, microscopic, and writhing without the need to point to any specific type of organisms or biological structures. For those concerned with scientific literacy this lack of correspondence between the images on the screen and their real-world objects is problematic. For the designers creating these entertainment products, however, their use of microscopic films is not meant to teach science. They use these films to create an interesting aesthetic and to suggest specific themes. But, they also believe that their use of microcinematographic films can communicate the complexity of microbial worlds and convey a sense of awe about the natural world. For a few title designers, microcinema allows them to express an appreciation for God's creation. Ultimately, I find that title designers utilize films of microscopic organisms in ways that touch upon microcinematographs' capacity to let us see what scientists see but also to show us how frightening, and beautiful, the microscopic world can be.

Acknowledgements

I wish to thank Oliver Gaycken and Laura Gaither for their comments on earlier drafts of this manuscript. This work was supported by the Wellcome Trust [100618].

Works Cited

- Allison, Deborah. *Promises in the Dark: Opening Title Sequences in American Feature Films of the Sound Period*. 2002. University of East Anglia, PhD dissertation. EThOS, uk.bl.ethos.247223.
- Allison, Deborah. "Novelty Title Sequences and Self-Reflexivity in Classical Hollywood Cinema." *Screening the Past*, 20, 2006, tlweb.latrobe.edu.au/humanities/screeningthepast/20/novelty-title-sequences.html, Accessed 16 September 2023.
- Allison, Deborah. "Beyond Saul Bass: A Century of American Film Title Sequences." *Film International*, 30 January 2011, filmint.nu/?p=202 introduction, Accessed 16 September 2023.
- Anderson, Peter. Skype Interview with the author. 4 March 2018.
- Byerley, Anne and Derrick Chong. "Biotech Aesthetics: Exploring the Practice of Bio Art." *Culture and Organization*, 21, 2015, 197–216.
- Cahill, James Leo. "Hors d'oeuvre: Science, the Short Film, and The Perception of Life." *Framework*, 52, 1, 2011, 66–82.
- Codrington, Andrea. *Kyle Cooper*. Yale University Press, 2003.
- Cooper, Kyle. Personal interview with the author. 1 July 2014.
- Curran, John, director. *The Painted Veil*. Warner Bros., 2006.
- Curtis, Scott. *The Shape of Spectatorship: Art, Science, and Early Cinema in Germany*. Columbia University Press, 2015.
- Doron, Claude-Olivier. "The Microscopic Glimpse: Spiritual Exercises, the Microscope and the Practice of Wonder in Early Modern Science." *Practices of Wonder: Cross-Disciplinary Perspectives*, edited by Sophia Vasalou, Cambridge, UK: James Clarke & Co, 2013, 179-200.
- Frankenheimer, John, director. *The Island of Dr. Moreau*. New Line Cinema, 1996.
- Gaycken, Oliver. *Devices of Curiosity: Early Cinema and Popular Science*. Oxford University Press, 2015.
- Green, Pamela and Jarik Van Sluijs. Skype Interview with the author. 12 March 2018.
- Gunning, Tom. "The Cinema of Attraction[s]: Early Film, its Spectator and the Avant-Garde." *The Cinema of Attractions Reloaded*, edited by Wanda Strauven, Amsterdam University Press, 2006, 381-388.
- Hirschbiegel, Oliver, director. *The Invasion*. Warner Bros., 2007.
- Hobson, Henry. Skype Interview with the author. 19 March 2018.
- Hopkins, Stephen, director. *The Reaping*. Warner Bros., 2007.
- Jennings, Christina, creator. *ReGenesis*. Shaftesbury Films, 2004.
- Keller, Eric. Personal interview with the author. 9 April 2018.
- Kelty, Christopher and Hannah Landecker. "A Theory of Animation: Cells, L-systems, and Film." *Grey Room*, 17, 2004, 30–63.
- King, Emily. "Taking Credit: Film Title Sequences, 1955-1965." *Typotheque*, 29 November 2004, www.typotheque.com/articles/taking-credit-film-title-sequences-1955-1965-2-introduction, Accessed 16 September 2023.

- Kirby, David A. "Movie Microbes Under the Microscope." *Microbiologist*, 14, 4, 2013, 17-19.
- Landecker, Hannah. "Microcinematography and the History of Science and Film." *Isis*, 97, 1, 2006, 121-132.
- Landecker, Hannah. (2011) "Creeping, Drinking, Dying: The Cinematic Portal and the Microscopic World of the Twentieth-Century Cell." *Science in Context*, 24, 3, 2011, 381-416.
- Last of Us*. Windows version, Naughty Dog, 2013
- Lee, Ang, director. *Hulk*. Universal Pictures., 2003.
- Leterrier, Louis, director. *The Incredible Hulk*. Marvel Studios, 2008.
- May, Julia. (2010) "The Art of Film Title Design Throughout Cinema History." *Smashing Magazine*, 4 October 201, www.smashingmagazine.com/2010/10/the-art-of-the-film-title-throughout-cinema-history/, Accessed 16 September 2023.
- Muschamp, Herbert. "Blueprint: The Shock of the Familiar." *New York Times*. 13 December, 1998, 61.
- Osther, Kirsten. *Cinematic Prophylaxis: Globalization and Contagion in the Discourse of World Health*. Duke University Press, 2005.
- Pearson, David. *New Organic Architecture: The Breaking Wave*. University of California Press, 2001.
- Perkins, Will. "The Last of Us Title Sequence: Interview with Henry Hobson." *Art of the Title*, 14 June 2103, www.artofthetitle.com/title/the-last-of-us/, Accessed 16 September 2023.
- Pilchowski, Robert. Personal interview with the author. 30 March 2018.
- Snyder, Zack, director. *Dawn of the Dead*. Universal Pictures., 2004.
- Stanitzek, Georg. "Reading the Title Sequence (Vorspann, Générique)," *Cinema Journal*, 48, 4, 2009, 44-58.
- Tosi, Virgilio. *Cinema Before Cinema: The Origins of Scientific Cinematography*. British Universities Film & Video Council, 2005.
- Tsivian, Yuri. "Media Fantasies and Penetrating Vision: Some Links Between X-Rays, the Microscope, and Film." *Laboratory of Dreams*, edited by John Bowlit and Olga Matich, Stanford University Press, 1996, 81-99.
- Ulloa, Alexander and Ian Albinson. "Hulk Title Sequence: Interview with Garson Yu." *Art of the Title*, 11 May 2009, www.artofthetitle.com/title/hulk/, Accessed 16 September 2023.
- Yount, Danny. Personal interview with the author. 30 June 2014.