

CINEMATIZING IMMUNITY: THE RHETORICAL EFFECTS OF SCIENCE FICTION IN THE PUBLIC COMMUNICATION OF SCIENCE

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The rise of science fiction and computer-generated imaging (CGI) technology have borne increasingly realistic visuals of both “science” and “fiction,” often in the form of science documentaries. Scholarship about using these documentaries for public education is inconclusive. This article furthers research in this area by rhetorically analyzing the BBC’s 2012 CGI documentary, *Our Secret Universe: Hidden Life of the Cell*. By communicating immunology through science fiction, *Secret Universe* illustrates that such an approach, although appealing, may also harbor undesirable outcomes and promote harmful ideals, especially when viewed in the context of global pandemics such as H1N1 and COVID-19.

We are all descended from a single pre-historic ancestor, a cell containing the single strand of DNA that started it all. But the virus is as old as we are. It has evolved alongside us, forcing us to adapt, to change or die in a deadly game of cat and mouse. This eternal arms race has driven our evolution and made us both stronger. We wouldn’t be what we are today were it not for this battle with our ancient enemy. The story of the cell is a story of innovation and change, and because viruses continuously force cells to change, they actually aid their adaptation to different environments. And for that reason, they’ve also helped shape us, they’ve made us who we are. Every minute of every day, this battle with the virus rages within seven billion

of us. Though we are rarely aware of it, we fight each other, change each other, improve each other.

—BBC’s *Our Secret Universe: Hidden Life of the Cell*, 2012

The dramatic lines in the epigraph above conclude Michael Davis’s documentary, *Our Secret Universe: Hidden Life of the Cell*, released by the BBC in 2012. Released two years after the 2009-2010 H1N1 pandemic, this documentary features selfless antibodies working alongside gallant macrophages to defend human cells in a heroic battle against an invasion of adenoviruses. The adenoviruses, who also play a leading role in this immune warfare, are depicted as cunning and resourceful. Rather than agents of destruction and

microscopic killing machines, they are more like smart infiltrators who are able to utilize advanced technologies and engage in difficult maneuvers to complete their objective. At the same time, the epic battle depicted in *Secret Universe* also emphasizes the striking similarities between our own cells and these foreign viruses, staging the cellular immune defense as an infinitely occurring arms race in which both sides evolve together and become increasingly powerful.

Because technological constraints make it impossible to actually film inside a cell, the producers of *Secret Universe* had to utilize extensive Computer-Generated Imagery (CGI) to visualize cellular processes and recreate them in a theoretically accurate virtual environment. Using concept art by visual artist Tory Miles, the director Michael Davis engages public audiences by adopting a strong science fiction narrative, making direct visual references to the popular science fiction movie series *Star Wars* not only in the cinematic camera techniques but also the artistic choices in rendering the virtual environment. By borrowing from the highly recognized cultural icon, Davis effectively paves the way for *Secret Universe* to reach a wider audience. However, the dominance of CGI and direct references to the genre of science fiction are not without their drawbacks. Produced by the same director, the 2003 Animal Kingdom production *Dragons: A Fantasy Made Real*, a CGI documentary completely based on fictional facts about mythological dragons, still faces critical debate. Biologist Anneke Metz calls works like this

“subjunctive documentary,” which she contends are of low educational value. Subjunctive documentaries, she writes, add to the challenge of separating scientific fact from science fiction in our media-saturated society. This concern remains valid when analyzing the use of CGI and science fiction elements in *Secret Universe* and raises a number of questions: What are the rhetorical effects of using CGI to communicate about science that is not visible to the human eye to public audiences? How do allusions to science fiction coupled with dramatic narration work rhetorically in a science documentary?

In this essay, I consider how the rhetorical strategies of dramatic narration work together with visual references to the sci-fi genre and with CGI to make *Secret Universe* a compelling and simultaneously problematic example of science communication. After a brief review of the literature on science communication, I investigate the historical background of the documentary’s debut and its novel allusions to the sci-fi genre in communicating immune science to the public. I then investigate the dynamic relationship between the presence of professional scientists and the presence of popular sci-fi themes and the effects of the dramatic narration by British actor David Tenant. Building on these, I analyze visual references and particular moments in the documentary that convey implicit arguments about the nature of cells and viruses. Finally, I reflect on the implications of these strategies for modern science communication.

VISUALIZING SCIENTIFIC COMMUNICATION

In her landmark study, “Accommodating Science: The Rhetorical Life of Scientific Fact,” published in 1986, rhetorician Jeanne Fahnestock describes the role of science communicators as “orators” who “interpret the wonders of twentieth-century science for lay readers, accommodating new knowledge to old assumptions and trying to bridge the gap between the public’s right to know and the public’s ability to understand” (276). While Fahnestock’s focus was on accommodating science for the print news media, namely “magazines and newspaper columns” (275), now, more than two decades later, the rise of visual media and developments in CGI technology have paved the way for the creation of more realistic and dynamic images of science. The increasing popularity of both science fiction and documentary has called for critical reflection on the role of fictional cinema in science communication. Regarding this trend, Wake Forest literature professor Derek Lee investigates the effect of utilizing science fiction as an educational tool in his 2022 article, “The Ethics of Extrapolation: Science Fiction in the Technical Communication Classroom.” According to Lee, “science fiction has carved out a special place in both mass culture and academic scholarship as a unique discourse for interrogating the dynamic interrelations between science, society, and the self” (77). By extension, Lee’s findings remain valid outside the college classroom, where science fiction may help the public audience make more ethically informed decisions. Yet, questions remain

about the efficacy of communicating real scientific facts through science fiction.

As I will explain, it is critical to understand the complicated nature of science within these fictional environments if we are to fully understand its broader rhetorical effects. In his 2008 article “Cinematic Science,” Professor of science communication David Kirby performs a critical analysis on the implications of movie depictions of science. Drawing on milestone sci-fi movies from the last 100 years, Kirby observes that “popular cultural depictions of science involve the production and presentation of an image of science whether or not the science has anything to do with the ‘real’ science (52).” According to Kirby, the producers of science fiction movies strive for a flexible level of scientific “verisimilitude” rather than rigorous scientific “authenticity” (42) because, in science fiction, the attractive storyline is always the main show, while scientific accuracy is simply an expendable and minor concern that exists to boost views. This imbalance can have a profound impact on the audience’s perception of real-world scientific issues such as climate change and genetic editing (50), and Kirby argues that the time has come for serious studies of cinematic science. My rhetorical analysis of *Secret Universe* responds to this call and investigates the position of real science in a sci-fi-saturated documentary.

While Kirby focuses more broadly on representations of science in sci-fi movies, the rise of CGI technology has also facilitated developments in science communication, particularly in science documentaries. Producers can now create realistic images of things that were

previously impossible to visualize and present them as authentic evidence. Metz's work on "subjunctive documentaries" specifically focuses on this phenomenon. To remain profitable in an increasingly competitive market, science-oriented television channels have begun using fiction and CGI extensively to attract viewers and increase subscriptions. This trend has profound rhetorical implications for the public's understanding of science, as these subjunctive documentaries aggressively insist "that the fictions they are 'documenting' not only could be real but truly are real, because CGI has made them so" (334). This is especially problematic because the audience might interpret the CGI images as reliable evidence backed by authoritative sources and ultimately make assumptions about science without fully understanding the nuances of these depictions.

Artistic and beauty-oriented exhibits of these CGI sciences are not only for the general public but also for professional scientists. Notably, aesthetic and beautiful depictions of science carry ethical implications in the scientific field. According to rhetoric and composition scholar Jonathon Buehl, traditional photographs from the pre-digital era are considered real because the audience holds implicit presumptions that champion their "naturalistic" validity (191). However, the advent of image editing technologies such as Photoshop has tempted some scientists to value "novelty or beauty" over "its resemblance to phenomena in the world" (193). Subsequently, when interacting with these more aesthetically pleasing images, the audience may fail to "question those presumptions if not attuned to common signs

of image manipulation" (200). In the case of *Secret Universe*, the visual beauty is striking, and I will address the rhetorical effects of such beauty as part of my analysis. On the other hand, beautiful scientific images can hold unique educational value for viewers and even provide critical insights for the creators. In her article "Neuroaesthetics of Visual Invention," technical and visual communication scholar Megan Poole argues against the conventional notion that "[p]retty pictures' do not exist in science" (76). Instead, she suggests that beauty and aesthetics in science allow scientists to converse with their subjects of study in making new interpretations and challenge predominant theories with new lenses. As Poole puts it, "sometimes scientific discovery requires an artist" (75).

Underlying all of these approaches to public communication about science, however, are different models of the public's relationship with science. While these models have been theorized by a range of scholars over the last few decades (e.g., Bucchi, Hilgartner), rhetorician of science Sarah Perrault's book, *Communicating Popular Science: From Deficit to Democracy*, synthesizes much of this conversation in two helpful models: the PAST and CUSP models. The PAST model, which stands for Public Appreciation of Science and Technology, theorizes that science communication is a "one-way flow of information from the scientific sphere to the public" (12). Perceiving the public as deficient in scientific literacy, the PAST model puts scientists in the position of unquestioned authority to educate the ignorant majority. Under the PAST model, the public

community and the science community remain distinctly separated, as “there is no room here for an involved public or for interactions between different segments of society” (13). In contrast, the CUSP model, which stands for Critical Understanding of Science in Public, views science communication as a “meeting point” for science and the public, where both sides can contribute (15). Here, the public engages scientific topics as not only learners but also stakeholders who provide critical reflection from their own perspectives. Perrault explains that popular science communication, in this model, “can praise science when praise is called for, challenge it when challenges are needed, and explain it in terms that situate it in its social, cultural, and material context” (17). When analyzing exhibits of popular science communication, these models are important because they each change the ethical implications of communication choices. In the PAST model, communicating science inaccurately or incompletely does not carry the same ethical implications, as the goal is mainly to increase the public’s appreciation. The CUSP model, however, changes these ethics because inaccurate or incomplete communication interferes with the public’s rightful role as stakeholders and impairs their capacity to engage critically in scientific discourse.

These analyses and theories provide critical insights useful for better understanding the rhetorical impact and implications of *Secret Universe* in popularizing immune science. Specifically, they lend depth to the analysis of *Secret Universe*’s references to the sci-fi genre,

use of CGI, and critical questions around the effect, effectiveness, and ethics of these choices in modern science communication. Scholarship by Fahnestock and Perrault further brings the film’s rhetorical context into focus. Building on their work, in the next section I will explore the implications of the documentary’s underlying messages about the nature of immunity during the 2009-2010 H1N1 and current COVID-19 pandemics in particular.

CONTEXT AND BACKGROUND: SECRET UNIVERSE AND GLOBAL PANDEMIC

In April 2009, “Swine Flu” overtook the newest online gossip on various celebrities, becoming a top-searched news term in Google. Scientifically known as the H1N1 flu, this newly identified strain contained a unique combination of pig, bird and human viruses. While commonly found circulating in pig populations worldwide, most humans had not been previously exposed to this strain. Lacking immunity, more and more people caught this contagious disease. In June of the same year, when the Centers for Disease Control and Prevention (CDC) finally declared the situation a pandemic, H1N1 had already spread to 74 countries and infected more than 60 million people. Under the crisis of a global pandemic, informing the public and arming them with scientific knowledge became pivotal

in containing the surge.¹ Now, as the world is confronted by the COVID-19 pandemic, some of the challenges faced by the scientific community more than ten years ago during the H1N1 pandemic are still relevant today, although the two pandemics differ substantially in scale and severity. While a short-lived pandemic that ended in 2010 with far fewer deaths than COVID-19, the H1N1 pandemic forms an important part of the rhetorical context for *Secret Universe* that would have shaped viewers' understandings of the documentary and may have played the role of exigence for the BBC and producer Michael Davis in making the film.

While most people would agree that flu symptoms are never pleasant, the public's understanding of how viral infections happen and how our immune system functions during viral infections can be rather limited. For the scientific community, clarifying common questions posed by members of the general

1. In the introduction to her 2014 book, *Rhetoric of a Global Epidemic*, technical communication scholar Huiling Ding offers an overview of the rhetorical implications of cross-cultural communication during SARS and H1N1, the two significant pandemics prior to 2014. According to Ding, because a cure was quickly found for H1N1, it did not cause a lasting panic and ultimately received much less media coverage than SARS (2). For more information on this subject, see Ding's book as well her recent articles on the subject matter, including: Ding, Huiling. "Crowdsourcing, Social Media, and Intercultural Communication about Zika: Use Contextualized Research to Bridge the Digital Divide in Global Health Intervention." *Journal of Technical Writing and Communication*, vol. 50, no. 2, 2020, pp. 141-166.

public— How does our immune system react to viral infections? Why are we immune to some viruses but not others? Why are vaccines important? —is critical to promoting general awareness and slowing the spread of a virus. The exigence prompted by a pandemic poses delicate challenges for the scientific community about science communication. While substantial research exists on science communication, much remains unknown about how best to communicate scientific information, and even more remains unknown about the effects and effectiveness of using science fiction to do so. As one of the earliest CGI documentaries that implements science fiction themes, *Secret Universe* provides crucial insight into how science accommodators can bridge the gap between scientific knowledge and public understanding in an engaging and accessible way.

The release of *Secret Universe* in 2012 also epitomized a significant shift in technological advancement. Although other documentaries in the twenty-first century had made use of CGI to communicate biological science, *Secret Universe* differs distinctly from these both because of how advanced CGI had become by 2012 and how Davis chose to use it. In comparison to Harvard University and XVIVO perfusion's 2006 video, "The Inner Life of the Cell," which was the world's first biology video created using CGI, *Secret Universe's* ethereal lighting, alien aesthetics, and overall more polished rendering set it apart from the more accuracy focused depictions of biological science. These distinctions situate the documentary as a novel approach to science communication

that combines CGI with science fiction to accommodate the invisible.

In what follows, I show how, by rendering its virtual environment in a dramatic realism approach rather than using virtual realism, *Secret Universe* corresponds to an attempt at scientific accuracy through narrative. While evaluating that accuracy may be worthwhile, my analysis focuses on investigating the rhetorical implications of communicating science through the lens of CGI and science fiction on both the societal and individual scales.

CINEMATIZING THE UNSEEN: THE CELLULAR WORLD UNDER SCIENCE FICTION LENSES

As a unique combination of documentary and science fiction, *Secret Universe* mesmerizes the viewer with its intricate, colorful, and extra-terrestrial-like CGI environment, pairing this with dramatic narration from popular British actor David Tennant to keep viewers on the edge of their seats. Throughout the documentary, visual allusion to science fiction movies is strong. Outside the cells, in the tranquil extracellular space, ethereal blue light shimmers from above, shining down upon a web of intricately connected cells as white blood cells and antibodies warily patrol the parameters (see fig. 1). This difference in color provides a sense of depth, as the upper part of the picture is permeated by a lighter blue, while the lower part is darker. Resembling the lighting in underwater environments, this scene unconsciously prompts the audience to see the contrast between the shallow and the deep,

conveniently perceiving the extracellular space as an underwater-like ecosystem. When watching this scene, the audience may be reminded of iconic underwater shots from classic sci-fi films, such as Disney's 1945 adaptation of *20,000 Leagues Under the Sea* or the 1999 *Star Wars: The Phantom Menace*.



Fig. 1. The Extracellular space in the human body with ethereal lighting and colors. Still from Davis, *Our Secret Universe: The Hidden Life of the Cell* (9:15); BBC; 2012.

In contrast to the serenity and calmness of the extracellular space, the cell interior gives the audience a sense of energy and motion. As the camera takes viewers inside the cell, everything is much more vibrantly chaotic. Fiery volcanic light burns in the background as brightly colored organelles zoom, bounce off, and crash into each other, pumping out energy in blinding lights and flashes (see fig. 2). With these artistic choices, the documentary effectively eliminates the strangeness and obscurity of microscopic biology, turning it into a context that is friendly to the audience through their familiarity with science fiction films like the 2008 adaptation of *Journey to the Center of the Earth*, where similar lighting and colors

are used to depict the scorching interior of a magma filled cavern.

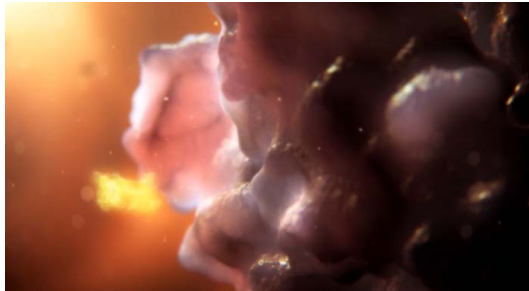


Fig. 2. The Cell Interior. Still from Davis, *Our Secret Universe: The Hidden Life of the Cell* (4:47); BBC; 2012.

In addition to the visual cues, the documentary features the beloved British actor and voice actor David Tennant as the narrator. Known by many for his roles as Doctor Who in the popular BBC television series and Barty Crouch Jr. in *Harry Potter*, Tennant's versatile and iconic voice adds a salient sci-fi vibe to *Secret Universe*. His lines also provide the audience with explicit signposting to situate the documentary in the popular genre:

Beneath the surface of every one (cell), lies a world stranger than any *science fiction*. A world in which a billion microscopic machines all play their part, working in concert through every second of our life. (02:31)

This direct reference to the science fiction genre sets the cinematic tone of *Secret Universe* instantly, as viewers are notified early on that they are about to witness not a rigid or monotonous textbook depiction of science but a dramatic and engaging sci-fi movie with the

witty and jovial “Doctor Who” as their guide. As this CGI environment captures the audience's interest and satisfies their curiosity about the cellular world, Tennant brings in a critical conflict to the plot of the documentary: “But these beautiful worlds are also on the frontline of the longest war in history” (01:07) This “war” is then clarified and amplified with an inserted interview with Professor Bonnie L Bassler of Princeton University: “These battles of the viruses against your cells, this amazing epic science movie is going on inside your body all the time, and you don't even know it” (01:50). Just as protagonists and antagonists are key to an excellent fictional movie, the epic cellular war would also be incomplete without the key microscopic players. Inside the 3D environment, fully animated cells with their own unique movements battle a fleet of maneuvering viruses. Similar to the conventional theme of good versus evil in popular culture, the components of the human immune system, such as antibodies and macrophages, are light in color, while the virus is jet black with a strand of black DNA inside. This clear distinction between good and evil allows the audience to take part emotionally in this epic battle, in which they are no longer passive onlookers but active participants who cheer on our gallant immune defenders as they fight the cunning alien invaders.

When comparing a cellular battle scene from the documentary (fig. 3) to a space battle scene in the popular science fiction movie *Star Wars* (fig. 4), the resemblance in coloring and lighting is very noticeable. In figure 3, the spherical infected cell stands out against a

pitch-black background, imitating a lone planet in space, similar to the Star Wars planet in figure 4. Both scenes utilize the color orange to induce a sense of apprehension and dread for the audience. Black loops, which can be seen in figure 3, are the virus' DNA copies, which resemble a fleet of alien spaceships rising from the surface of the foreboding fallen planet. In figure 3, the spherical infected cell stands out against a pitch-black background, imitating a lone planet in space, similar to the Star Wars planet in figure 4.

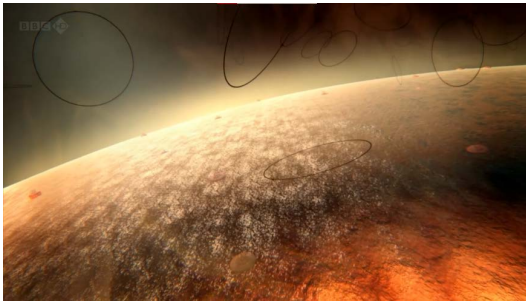


Fig. 3. A Cell infected by viruses. Still from Davis, *Our Secret Universe: The Hidden Life of the Cell* (47:13), BBC; 2012.



Fig. 4. Spaceship flies over the planet Coruscant. Still from Lucas, *Star Wars: Revenge of the Sith*, (1:57), Lucasfilm; 2005.

To make the cellular warfare more engaging, *Secret Universe* implements conventional cinematography techniques that reference the sci-fi action film genre. As the viruses make their way into the human body, a tracking shot that follows closely behind a virus is used (fig. 5). In popular science fiction films, this tracking shot is commonly used to follow spaceships in space battle scenes (fig. 6).



Fig. 5. Tracking shot of two viruses flying towards a cell. Still from Davis, *Our Secret Universe: The Hidden Life of the Cell* (13:00). BBC; 2012.



Fig. 6. Tracking shot of two spaceships flying towards a planet. Still from Lucas, *Star Wars: Attack of the Clones* (1:59), Lucasfilm; 2002.

When presented with the unfamiliar topic of cellular interactions, non-specialist viewers

may feel lost in the strange world of scientific jargon and biochemical processes. However, by implementing direct visual references to familiar epic science movies and providing aural guidance with a familiar narrator, *Secret Universe* effectively keeps the audience on the edge of their seats from beginning to end. While scientific documentaries are often seen as monotonous sessions that lecture on lifeless information, this documentary has become an engaging science fiction film that stimulates the audience's attention at every turn.

STRUCTURING THE VIRTUAL SECRET UNIVERSE: SCIENCE AS THE SIDESHOW

As a type of educational visual exhibit that aims to communicate science to the public, science documentaries are frequently expected to provide accurate information backed by vigorous interviews with authoritative professional scientists. However, this is not the case with BBC's *Secret Universe*. Unlike conventional science documentaries, the cinematic CGI war between the cell and virus becomes the main attraction, while the scientists and scholars in *Secret Universe* take a sideshow position. In the 58-minute documentary, the interviews of scientists sum up to less than 10 minutes, making them less than one-fifth of the documentary's total. However, as I will explain, because of the persuasiveness of the visualizations, the lack of scientific interviews does not concern the documentary's viewers.

According to Fahnestock, there are two approaches to the epideictic rhetoric of science

communication. The deontological approach accentuates the wonder of the subject by associating it with the audience's preexisting beliefs and values, whereas the teleological approach underscores the possible benefits of that subject in its future applications (279). Because there is no scientific information on what the cellular environment really looks like, the producers have to use their own imaginations to construct and paint this microscopic world from scratch. The use of CGI allows the producers to create an intricate and vibrant cellular environment, appealing to a movie audience's love of beauty and curiosity towards the unknown through a deontological approach. Subsequently, how to engage the audience while maintaining scientific accuracy becomes a critical concern for *Secret Universe*.

To establish a sense of scientific accuracy, *Secret Universe* starts with pictures of cells under the microscope and a cutscene of a scientist in a lab coat using a microscope. In fact, this is the only scene where a scientist is seen in a laboratory setting operating professional equipment. As the scientist gazes into the microscope, Tennant promptly adds descriptive narration: "In the last decade, scientists have been able to witness what once seemed impossible...the world inside a human cell" (00:4). In this scene, Tennant's narration serves a strong deontological purpose. By using the word "impossible," Tennant alludes to the "invisible" and "unseen" property of the human cell, stimulating the audience's curiosity about the microscopic secret universe. The audience also becomes attuned to the novelty of microscopic technology.

This deontological appeal is strengthened by a brief interview cutscene that follows immediately after the unnamed scientist. Professor Steve Jones of University College London is seen standing in front of green foliage with natural outdoor lighting as he says, “When I was a student, the idea of being able to burrow deep inside a cell, was unthinkable” (00:08).

In her article, Fahnestock observes that science communicators often consult with the original authors of a scholarly article and directly quote them in the accommodated pieces (285). In the modern age of visual media, this process has developed into the use of video interviews. By placing this interview straight after Tennent’s deontological appeal, it not only strengthens the appeal but also increases the authority of the documentary. Upon hearing Jones’ recollection, the audience will realize that today’s possibilities were unimaginable in the past. In addition, they might even feel privileged to learn biological knowledge from the frontiers of science. With Tennent’s guiding narration and Jones’s professional input, *Secret Universe* effectively persuades the audience that what they are seeing are accurate depictions of science backed by professional figures.

Interestingly, while the documentary features two additional prominent scholars in the field of biology, none of these scholars are interviewed in a laboratory or office environment. Professor Bonnie Bassler of Princeton University, whose narration/commentary transitions the documentary from an introduction of the human cell to the viral infection, stands on a terrace overlooking a busy city district lined with skyscrapers. To accentuate the activity and restlessness of the familiar urban

environment, sounds from busy traffic can be heard in the background as Bassler says:

Every day our bodies are constantly bombarded by these invisible critters, bacteria and viruses. But we have our skin, it’s our first line of defense that keeps them out. But we have Achilles heels - we have openings to the outside world, our mouths, our noses, we touch things, we rub our lips, we rub our eyes or wipe our nose. They can get in. And once they’re in, they’re in. (08:19)

By swapping scientific terms for everyday language (“invisible critters,” “defense,” “Achilles’ heels,” and “openings”), Bassler provides the audience with vivid descriptions of how bacteria and viruses can easily enter the human body. Relatedly, Fahnestock makes an intriguing observation on the rhetorical changes of scientific facts under written science communication: “Accommodating the scholarly piece for the non-scholarly magazine is not, therefore, simply a matter of translating technical jargon into non-technical equivalents” (280). According to Fahnestock, accommodation happens on a deeper level, where “true accommodation involves finding the points of interest in the topic that will appeal to readers who are not apiologists or even specialists in any life science” (280). The exuberant inputs from Bassler add to the nature of *Secret Universe* as an exhibit to induce wonder and entertain the audience as they learn about the complexities of our immune process.

In *Secret Universe*, Bassler makes two bold rhetorical moves to spark the audience’s

interest in viral infections. Bacteria and viruses are comically categorized under “invisible critters,” a direct reference to the 1986 science fiction franchise *Critters*, which revolves around a group of malevolent carnivorous extraterrestrials. In utilizing this cultural reference, Bassler explicitly prompts the audience to draw a connection between the fictional Critters and the microbes. Being black, round, spiky, and unquestionably evil, the mental image of the iconic Critters spontaneously allows the audience to see the bacteria and viruses similarly, associating the maliciousness of the Critters with the harm of the microbes. This science fiction reference effectively strengthens the epic warfare narrative in *Secret Universe*.

Following up with the allusion to Achilles’ heel, Bassler draws a clear line between both sides of the battle: the vicious and unseeable microscopic intruders versus our seemingly impenetrable immune defenses. In Greek mythology, Achilles was a demigod hero who fought in the Trojan War. Having been bathed in the water of the river Styx, he became invincible but for the heel that his mother held him by and was ultimately killed with an arrow to his heel. With the clever use of Achilles’ story, Bassler is able to kill two birds with one stone, as she not only describes the effectiveness of our immune defenses but also underscores its critical flaws, our openings to the outside world, and the ultimate inevitability of being infiltrated by the bacteria and viruses. These examples underscore that, unlike most science fiction documentaries that back up the scientific information with authoritative support from scientists, *Secret Universe* employs

the scientists like Jones and Bassler to provide complementary narration. While these interviews do not provide much scientific support, they contribute to the documentary’s rhetorical goal of not only engaging the audience but also maintaining an acceptable degree of scientific rigor.

HIDDEN INTERPRETATIONS: IMMUNOLOGICAL DARWINISM AND THE INSIDIOUS NATURE APPEAL

On the surface, the immune science communicated in *Secret Universe* is straightforward. In contrast, the documentary’s overarching metacommentary on the nature of human immunology and our relationship with viruses cannot be summarized in brief sentences and leaves much up to audience interpretation. In the following section, I investigate some complex messages conveyed in *Secret Universe* that may generate potentially harmful interpretations under the current COVID-19 pandemic, specifically, the documentary’s neglect of vaccination as an important related issue and a leaning towards the naturalistic approach to immunity.

Given the dominant presence of CGI and sci-fi-themed storytelling in *Secret Universe*, the war between the cell and the virus naturally becomes the key conflict and focus of the documentary. Influenced by this shift in focus, the presence of bio-militaristic language is salient throughout *Secret Universe*. In presenting the key players in the immune process, microscopic participants on both sides are introduced, personified, given militaristic roles, and finally

placed in the ongoing epic war. On this cellular battlefield, the white blood cells are “roving soldiers” that “check the protein fragments for signs of damage or infection,” while antibodies are the “cloud of resistance” that “patrol the space between our cells, looking for viruses.” Intriguingly, while the documentary does not elaborate on how these microbes move, communicate, and identify viruses, it does go into great detail in presenting the audience with a vivid description of how the white blood cells and antibodies work together to vanquish the viruses:

Recognizing the invader, they lock to the virus’s armor plating, shackling them together, making the viruses easy meat for the white blood cells that feed on alien invaders like these. Antibodies and white blood cells form the front line of our immune system. (11:00)

To amplify the epic warfare narrative, the documentary script uses diction that distinctly conveys personification, specifically “invader” and “easy meat,” as well as diction that conveys dynamic action, specifically “lock on,” “shackling,” and “feed on.” In this case, the documentary’s objective is not to thoroughly explain science to the audience but to engage them through dramatic narration. By utilizing this vocabulary, *Secret Universe* is not deliberately neglecting scientific accuracy, only favoring the language that fits better into the genre of warfare narrative in science fiction. Notably, the use of bio-militaristic diction is not uncommon in exhibits of science communication. During the H1N1, journalists often

used similar metaphors such as “ ‘combat,’ ‘battle,’ ‘contain,’ ‘quarantine,’ and ‘closure,’ to stress the need for an immediate, calculated response” (Ding 2). According to Fahnestock, in her discussion of scientific accommodation, “glamorizing is the writer’s purpose throughout the accommodation, part of his heavy task of bringing a deliberately dry research report into the realm of interesting journalism” (281).

However, the way in which the audience will perceive and interpret this predominant bio-militaristic attitude is questionable. Not only does the bio-militaristic attitude neglect the existence of autoimmune diseases and non-malicious viruses and bacteria, but it also fails to recognize the extent of cellular communication that is needed for our immune system to function. Not least, it promotes a debatable position on the nature of the human immune defense: the analogy of cells versus viruses as a beneficial evolutionary arms race. Specifically, in *Secret Universe*, the adenoviruses, who play the antagonist role in this immune warfare, are portrayed as having a more well-rounded nature that is not limited to being purely harmful and destructive. Chosen to represent all viruses, the adenoviruses are not simply depicted as evil microscopic killing machines but more like smart and resourceful infiltrators who can utilize advanced technologies and engage in difficult maneuvers to take over the cell. In the concluding lines of *Secret Universe*, the following narration (also quoted above in my epigraph) is played to allude to the striking similarities between our own cells and the viruses:

We are all descended from a single pre-historic ancestor, a cell containing the

single strand of DNA that started it all. But the virus is as old as we are. It has *evolved* alongside us, forcing us to *adapt*, to *change or die* in a deadly game of cat and mouse. This eternal *arms race* has driven our *evolution* and made us both stronger. We wouldn't be what we are today were it not for this battle with our ancient enemy. The story of the cell is a story of *innovation* and *change*, and because viruses continuously force cells to *change*, they actually aid their *adaptation* to different environments. And for that reason, they've also helped shape us, they've made us who we are. Every minute of every day, this battle with the virus rages within seven billion of us. Though we are rarely aware of it, we fight each other, *change* each other, *improve* each other. (53:15-54:48, emphasis added)

Here, the discussion's focus has shifted from communicating immune sciences to a much more sophisticated one, which is the enduring role of viruses in the long run of human evolution. By employing excessive evolutionary terms such as "evolved," "adapt," "change," and "improve," the documentary is aggressively explicit in enumerating the benefits of this epic immune warfare, arguing that that the battle between our cells and the viruses have aided the evolution of our species and made us more adapted to the environment.

While concluding with a teleological appeal effectively decreases the viewers' fear and motivates them to better appreciate the immune process, the move also generates implications for the public discourse on viruses

and pandemics. Without providing sufficient background information on human evolution and epidemiology, the documentary might influence viewers to adopt a harmful Darwinist standpoint regarding the nature of pandemics. Failing to realize that human evolution is a long-term process, viewers might interpret "change or die" in the literal sense, perceiving the ongoing pandemic as a current evolutionary process that distinguishes the strong and the weak. In addition, the strength and assertiveness of this statement, in saying that our existence depends on immune warfare, make it more like a zealous argument advocating the faultless value of viruses than an objective observation that considers the full picture, including the fact that viruses can be beneficial, harmful, or even benign depending on the circumstances. By saying that viruses "continuously force cells to change" and "actually aid their adaptation to different environments," the documentary plays into the assumption that cells emerge victorious from this immune warfare all the time, which is not always the case.

And yet the move to mitigate the harm of the virus and empower our immune system is seen multiple times throughout *Secret Universe*. During an interview cutscene, Bassler appears to reassure the audience:

Even though the individual cells are fighting this epic battle against viruses, remember, you have trillions of cells, and so even if one cell loses its war, most of the time the organism wins, and we get better. (51:50)

In contrast, the harm of the viruses is promptly downplayed in a brief introduction of the adenovirus:

Once inside, any one of these viruses can take control of the cell and reproduce 10,000 times over. The result could be anything, from the common cold to pneumonia—even death. (09:54)

Notably, although both these examples both emphasize the numerical aspect of cells and viruses in the immune process, the takeaway is that the chance of the cells winning is high, while the result of death is just a possible but ultimately unlikely outcome. This creates a logical paradox for *Secret Universe's* adenoviruses: while adenoviruses are chosen to represent all viruses, they cannot strictly represent the viruses that are much more dangerous, such as the novel coronavirus (Yang et al. 3). Public audiences, especially those who viewed the documentary in 2020 or later, would be at risk for overestimating the competence of their own immune system. With the rise of the COVID-19 pandemic and increased public discourse about how viruses spread and how vaccines work, *Secret Universe* might lead viewers to believe that the current coronavirus will improve their fitness. In the concluding section, I will discuss the range of issues that scholars must consider when documentaries like *Secret Universe* are used for public education and how the effects of such work have changed in the midst of the COVID-19 pandemic.

CONCLUSION AND IMPLICATIONS: VISUALIZING SCIENCE COMMUNICATION IN A POST-COVID WORLD

Given the development in CGI technology and the increasing popularity of the science fiction film genre, it is clear that more studies are needed to investigate the positions of an emerging genre of science communication documentaries. Boldly combining science and science fiction, documentaries like *Our Secret Universe: Hidden Life of the Cell* strive to educate the audience about important scientific knowledge, which might otherwise seem complicated or distant, in an engaging and accessible way. In under one hour, *Our Secret Universe* effectively tells the story of the human cell's battle against viruses. Beginning with our inhaling a swarm of viruses, to our immune systems tackling the viruses at every corner, to the loss of some cells, and finally to the victory for the whole organism, the documentary never ceases to stimulate viewers. With intricate CGI animation, dramatically narrated sci-fi warfare, and exaggerated deontological appeals, *Our Secret Universe* is able to keep the audience on the edge of their seats from beginning to end and inspires them to appreciate our immune system like never before.

However, the same cinematic and rhetorical choices bring an equal number of implications to the subject of science communication, especially ten years later. To avoid losing the audience's attention, *Secret Universe* purposefully decreases the presence of scientists and scholars, populating the documentary with

CGI scenes of cells versus the viruses. As a documentary that strives to visualize unseeable microscopic processes while alluding to the sci-fi genre, this blurs the line between accurate accommodations of science and fictional adaptations. In addition, the presence of scientists is noticeably low in *Secret Universe*, where they contribute less than twenty percent of screen time. The scientists are not interviewed in their professional environments and, rather than offering professional input, provide complementary narration that builds on the dramatic narrative. This ultimately places the science in a sideshow position while the CGI epic battle becomes the main show.

Perhaps even more questionable is the documentary's metacommentary on the nature of human immunity and our relationship with viruses. By accentuating the similarities between the human cell and the virus, the documentary's final message that viruses drive our own evolution can work to generate problematic interpretations. Together, the heavy presence of bio-militaristic terms and the naturalization of the virus may lead the audience to take on an insidious Darwinist standpoint regarding pandemics, understanding it as a so-called "survival of the fittest" scenario. In addition, perceiving viruses as always innately beneficial to humans, viewers may overlook the dangerous effects of some viruses not generalizable by the adenovirus in *Secret Universe*.

Moreover, public audiences who view the documentary in the wake of the COVID-19 pandemic, which began in 2020, may interpret the absence of certain subjects as arguments against them. The neglect of vaccinations in

Secret Universe, which plays a critical role in helping humans fight dangerous viruses, is hugely problematic. Without any information on vaccinations, unaware viewers are more likely to view themselves among the strong rather than the weak and may overestimate their own immune fitness, which could lead to indifference toward and even rejection of vaccinations. Under the nature appeal in ancient Greek philosophy, the laws of nature are "regarded not [simply] as generalized descriptions of what actually happens in the natural world... but rather as norms that people ought to follow" (Sauders). In the kairotic moment of the current COVID-19 pandemic, this minor yet potentially insidious appeal could give credence to anti-vaccination sentiments and further promote the Darwinist view on immunology.

While ethically noxious, these implications are also problematic for the viewers themselves and, in the context of a pandemic, for public health. Although the documentary may evoke a powerful sense of wonder, closing the divide between the public and science through appreciation under the PAST model, its assertive claims on immunology do not give viewers enough room to effectively "probe and criticize" under the CUSP model. In essence, the rhetorical implications hiding under the surface of this awe-inspiring secret universe may be less than wonderful and generate undesirable outcomes.

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