

Elements of Science Fiction in Selected Works by Andy Weir

Jana Homolková

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děkan

doc. Mgr. Roman Trušík, Ph.D.
ředitel ústavu

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ABSTRAKT

Tato bakalářská práce se zaměřuje na prvky sci-fi v dílech *The Martian* a *Project Hail Mary* od amerického spisovatele Andyho Weira. Teoretická část představuje vývoj žánru science fiction a sleduje jeho proměny až do současné podoby. I přes komplexnost žánru se práce snaží vymezit hlavní rysy moderní sci-fi a tyto klíčové prvky následně aplikovat a analyzovat v dílech Andyho Weira.

Klíčová slova: Andy Weir, sci-fi, *The Martian*, žánr, *Project Hail Mary*, novum

ABSTRACT

This bachelor's thesis focuses on the sci-fi elements in the books *The Martian* and *Project Hail Mary* by American author Andy Weir. The theoretical part presents the development of the science fiction genre and traces its evolution which helped to shape its modern form. Despite the complexity of the genre, the thesis aims to define the key characteristics of contemporary sci-fi and applies these elements in an analysis of Andy Weir's works.

Key words: Andy Weir, sci-fi, *The Martian*, genre, *Project Hail Mary*, novum

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I hereby declare that the print version of my bachelor's thesis and the electronic version of my thesis deposited in the IS/STAG system are identical.

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INTRODUCTION

Science fiction (sci-fi) is a literary genre that explores imaginative and futuristic speculative scenarios rooted in science and technology. Often set in space, the distant future, or alternative realities, sci-fi offers authors a platform to explore the potential consequences of scientific progress, social change, and human behaviour in unfamiliar or extreme conditions. Novels within the science fiction genre are often more than tales set in imaginary worlds. These stories serve as a mirror to the rapid advancement of technology, offering both warnings and inspiring visions of new ideas and possibilities.¹

This bachelor's thesis begins with a theoretical overview of the genre's development, tracing its evolution from early speculative fiction to its modern form. While sci-fi is a broad and complex genre, the aim is to define the key elements of contemporary science fiction, as those are relevant for the analysis of the chosen novels. The following chapters focus on concepts, essential for contemporary science fiction, such as the *novum* and cognitive estrangement, as well as the importance of worldbuilding, crucial techniques for constructing a believable sci-fi universe. The thesis then proceeds to a brief chapter on author Andy Weir, whose novels *The Martian* (2014) and *Project Hail Mary* (2021) are analysed further in the thesis.

The analysis of the chosen novels compares their key sci-fi features, drawing on the theoretical framework introduced earlier. It also explores differences in narrative style, recurring motifs, and central themes, including topics like communication with alien life and environmental issues tied to future technological development. Andy Weir in his novels embraces the features of hard sci-fi in order to emphasize the importance of logic through the *novum*, not as a magic trick, but as a logical foundation that drives the plot, rooted in real science extended into imaginative futures.

¹ 'What Is The Purpose of Science Fiction Stories? – Project Hieroglyph', accessed 21 November 2024, <https://hieroglyph.asu.edu/2016/04/what-is-the-purpose-of-science-fiction-stories/>.

1 SCI-FI

Science fiction is a literary genre that blends scientific ideas with imaginative storytelling to explore futuristic worlds and possibilities. Often unfolding in distant galaxies, future societies, or alternate dimensions, sci-fi invites readers to consider how advancements in science and technology might reshape humanity, culture, and our understanding of reality.

This part of my thesis will focus on the development of the genre as it is essential to understanding the genre and its characteristics, which will be examined as well, together with novum and worldbuilding of sci-fi.

1.1 The Development of Sci-fi

The usual point at which science fiction is considered to have emerged is the beginning of the 19th century. Although writers have experimented with themes such as time travel, the exploration of different universes, immortality or themes related to religion, which were quite fantastical from the earliest times, we cannot truly say when the genre arose.²

The steps towards the birth of the genre began to escalate in the seventeenth century with novels such as *The Blazing World* by Margaret Cavendish (1666) or in the eighteenth century with Jonathan Swift's *Gulliver's Travels* (1726).³ As Adam Roberts describes: "As in Gulliver's visit to the island of Laputa, Silicon Valley novels take us into a dystopian enclave – the Silicon Valley workplace – characterised by both advanced technology and social dysfunction,"⁴ the novel has a complicated story, but it takes the reader through the exploration of a new world that is not on planet Earth. At the same time, the book deals with social dysfunction, which is reflected in the escalating problems of another civilisation. The much more accepted beginning is Mary Shelley's *Frankenstein* (1818). The concept of creating a being, carefully described along the process, is considered one of the most important aspects in sci-fi, the ability to explain how something works. Both the book and this feature will be discussed later in the theoretical section.

However, the first true sci-fi novel, according to Edward James, which exhibits the characteristics relevant to the author studied in this thesis, is *The Time Machine* (1895) by

² Adam Roberts, *The History of Science Fiction* (Basingstoke: Palgrave Macmillan, 2005), 32.

³ Roberts, 281.

⁴ Roberts, 281.

H. G. Wells.⁵ With the themes of time travel and other hard sci-fi motifs, as the term will be explained later, this novel brings the genre into its familiar style.

1.1.1 17th Century

In the early days of the genre, cosmic journeys became an idea of many pieces written at the time. It was a century of new inventions and discoveries. As James and Mendlesohn say, the Baroque was still influencing many areas of life. The development of early cosmological thought was closely tied to the geocentric worldview commonly held by the Church, which effectively created a restrictive environment for alternative theories. Authors exploring concepts such as heliocentrism were at risk because they challenged established dogma. As a result, narratives of space exploration began to emerge that reflected a shift in perspective and a loosening of previous constraints.⁶

The theme shifted from classic fiction to more extraordinary voyages into space or simply living on the moon, which had not been common before, as authors gained the confidence and new knowledge provided by the shift in understanding of the universe.

One of the authors who thought beyond the Earth was Francis Godwin with his work *The Man in the Moone* (1638), where he boldly wrote about the not yet widely accepted solar system, during the beginning of the shift.⁷

1.1.2 18th Century

Eighteenth century brought new ideas and horizons into the sci-fi genre, as Roberts suggest, and shows on an example, Jonathan Swift's *Gulliver's Travels* (1726), where the main protagonist travels into utopian and dystopian realms and societies of a strange world, where he met another species. He also explores the irony and bring the social criticism into the sci-fi world.⁸

As previously mentioned, there is a broad new range of topics that are addressing the gaps in knowledge concerning space travel and habitation on the Moon from the previous century. It is imperative to emphasise that, despite the vividness of the Swift's world, the

⁵ Edward James, *Science Fiction in the Twentieth Century* (Oxford New York: Oxford University Press, 1994), 12.

⁶ Edward James and Farah Mendlesohn, eds., *The Cambridge Companion to Science Fiction* (Cambridge ; New York: Cambridge University Press, 2003), 16.

⁷ Edward James and Farah Mendlesohn, eds., *The Cambridge Companion to Science Fiction* (Cambridge ; New York: Cambridge University Press, 2003), 16.

⁸ Adam Roberts, *Science Fiction*, 2nd ed (Abingdon: Routledge, 2006), 41.

description did not adhere strictly to the principle of elucidating the mechanisms and processes that give rise to the functioning of entities and the genesis of species. This is a significant observation, as it underscores the necessity of analysing the world-building techniques employed by Andy Weir in the context of sci-fi features. As will be demonstrated in Chapter 4, which is devoted to a discussion of present-day perspectives on the genre and its characteristics, the phenomenon under discussion can be explained.

From 1743 to 1750, stories began to include the idea of a classical cosmic voyage, where a hero travels through space, similar to the story of Marie-Anne's *Journeys of Lord Seton in the Seven Planets* (1765). The social problems in Erath suddenly disappeared into space, and in doing so, showed that the same problems could be found in a new and foreign place. The problem is not this planet, but rather the civilisation.¹⁰

However, this century is still struggling with the tension between Catholic, Protestant church and new ideas about the cosmos, flying, technology and science break through. which is reflected in the literature.¹¹

1.1.3 19th Century

In the 19th century, science fiction started to be seen as something positive, and more and more people started reading it. At the same time, it brought fresh ideas. All of this happened because of new scientific research, inventions, experiments and discoveries. These researchers started the topic, which some people might think is shocking and unsuitable for publication.

Numerous authors thoughtfully explored these ideas. I would only like to introduce a few of them. The first two, Mary Shelley and Edgar Allan Poe, wrote during the 19th century. Their stories were very advanced for the time, and the readers would have found them very believable.

Followed by Jules Verne and Herbert George Wells, who as Roberts says, really used all the information they could gather to write their books. Their worlds and inventions were completely new and futuristic. Their stories were important for understanding social problems, because they included most of these problems in their worlds..¹²

¹⁰ Roberts, *Science Fiction*, 41.

¹¹ Roberts, *The History of Science Fiction*, 66.

¹² Roberts, *Science Fiction*, 44-45.

This broadens sci-fi's reach beyond just imagination. These stories look at innovative ideas and technology, showing both the dangers and the good things, industrial progress can bring. They also serve as warnings.¹³

1.1.4 Mary Shelley and Edgar Allan Poe

It is a commonly accepted view that Mary Shelley's book *Frankenstein, or the Modern Prometheus* (1818) is a Gothic text. However, closer inspection reveals a number of features that are commonly associated with science fiction. The narrative is more aligned with the gothic tradition, yet the creature and the process of its creation by the doctor Frankenstein are described in meticulous detail and with a scientific accuracy that engenders a sense of realism.¹⁴

Mary Shelley did her research properly before writing her books. It focuses on the scientific possibilities of creating a human being and the fantastic aspect of giving it life. This means it is part of the science fiction genre. It's similar to other stories where the main character has a problem fitting in.¹⁵

Shelley's idea to write a story about the creation of artificial life was inspired by Giovanni Aldini's experimentations with electrical resurrection and the new understanding of anatomy. These experiments showed that electricity could bring something to life or resurrect one's body.¹⁶

She introduced the idea of researching the evidence and technology that has made the genre better. Shelley also described how she created the world in the same way that she had researched it, so that the reader could understand and imagine the world in the same way that the author intended.

Edgar Allan Poe did something similar in his poem *Al Aaraaf* (1829), which was written in the early stage of his career. In this poem, he talks about the afterlife in a place called Al Aaraaf, which was inspired by the Koran. Shelly set the foundations for hard sci-fi, and Poe came up with the beginnings of soft sci-fi. The term will be explained later in the chapter 1.2.

¹³ Brian W. Aldiss and David Wingrove, *Trillion Year Spree: The History of Science Fiction* (London: Grafton Paladin, 1988), 396-398.

¹⁴ Leeds Libraries, 'Mary Shelley – The First Science Fiction Author', *The Secret Library | Leeds Libraries Heritage Blog* (blog), 26 October 2023, <https://secretlibraryleeds.net/2023/10/26/mary-shelley-the-first-science-fiction-author/>.

¹⁵ Libraries.

¹⁶ Richard Holmes, 'Science Fiction: The Science That Fed Frankenstein', *Nature* 535, no. 7613 (July 2016): 490–91, <https://doi.org/10.1038/535490a>.

Later on, he also started writing hard sci-fi, like his book *The Conversation of Eiros and Charmion* (1839). This book is about the idea of a comet colliding with Earth, which would destroy all civilisation, however, the narrative does not focus on this phenomenon; rather, it is an examination of the discourse between two souls, Eiros and Charmion, concerning existence and the prospect of what lies beyond.¹⁷

In order to comprehend the full extent of Poe's contribution to the genre of science fiction, it is imperative to undertake a thorough examination of his approach to narration. As Suvin wrote:

Though his ideology and time-horizon tend to horror-fantasy, the pioneering incompleteness of his work provided SF too with a wealth of hints for fusing the rational with the symbolical, such as his techniques of gradual domestication of the extraordinary and of the “half-dosed eye” estrangement just glimpsing the extraordinary.¹⁸

According to Suvin Poe is one of the first theoretician of sci-fi as his notes showed “verisimilitude, analogy, and probability for the wondrous story”¹⁹ His way of writing comments and the overall thinking about stories inspire many writers after him. His ability to combine real, imagined and technical motifs, interweave them with elements of social critique, intellectual commentary, and the grotesque, allowed him to create a body of work that is both thought-provoking and terrifying.

He had a remarkable talent to connect with the reader through his imagery, skilfully transforming magic into science with precise explanations that seemed to enter the reader's mind and create the intended effect.²⁰

These two authors are considered to have set the basics for sci-fi, as both of them used themes in their works that later became central to the genre. Mary Shelley, for example, created an entirely new being using only electricity, and gave him a mind and personality. She carefully described the process of his creation and explained how it was possible for him to act and think the way he did. This sparked a strong fascination among readers, who were drawn to understanding the forces and processes behind such creations. *Frankenstein* drawn sci-fi closer to nowadays understanding of the genre, by not just stating that life was created,

¹⁷ Roberts, *The History of Science Fiction*, 99.

¹⁸ Darko Suvin, *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre* (New Haven: Yale University Press, 1979), 145.

¹⁹ Suvin, 145.

²⁰ Roberts, *The History of Science Fiction*, 99.

but by showing *how* it was done, detailing the method and the world Shelley shaped to make his existence believable..²¹

In a similar manner, Poe crafted his stories to immerse the reader in a world that felt both plausible and deliberately fantastical for the intended audience.

1.1.5 Jules Verne

Jules Verne's early career differed significantly from his later success. He began with short stories, none of which achieved widespread fame. He pursued writing while working as a stockbroker to finance it – an experience that may have shaped the recurring theme of journeys within his narratives..²²

Despite his non-Anglophone background, the author has produced significant works in the field of hard science fiction, introducing several notable features to the genre. As for the relevant for this thesis, Andy Weir's style uses science and mixed reality with future, along with new inventions as well.

Journey was a big inspiration for many of his writings. Suvin suggested that his stories were written as “romans scientifiques” (en. Scientific novels) for the complexity of his narratives comparable to the novels..²³ As Roberts says:

Verne's novels are not only about the restless urge to move on, to explore further, to seek, to strive, to find and not to yield: they also embody this thematic in their own form.... This restlessness so often takes a circular trajectory – around the world, not to the moon but around the moon and so on – precisely because Verne is articulating an ideological stasis..²⁴

One of the author's most renowned novels is undoubtedly *Voyage to the Centre of the Earth* (1864), which takes the reader to the core of an island of unknown origin where prehistoric fauna and flora survived in their original biotope..²⁵ This serves perfect example. The reason for the trip is curiosity, not the need to live. It was a strong feeling to find out about something new and use the science of the time for something important.

²¹ 'TWTS: The Fantastic and/or Fantastical Voyage of “Fantastic” and “Fantastical”', Michigan Public, accessed 29 November 2024, <https://www.michiganpublic.org/show/thats-what-they-say-1/2021-10-10/twts-the-fantastic-and-or-fantastical-voyage-of-fantastic-and-fantastical>.

²² Roberts, 131-132.

²³ Suvin, *Metamorphoses of Science Fiction*, 12.

²⁴ Roberts, *The History of Science Fiction*, 136.

²⁵ Roberts, *Science Fiction*, 44.

Verne enlarges the category of the hard sci-fi with his books like *Twenty Thousand Leagues under the Seas* (1869-70) or *The Eighty-day Tour of the World* (1872). They were looking at what new technologies could do, as well as the social situation of people like Nemo a revolutionary captain.²⁷

Verne never goes beyond what is at least somewhat known, proven, or scientifically possible. This makes him different from his colleague, H.G. Wells, who often writes about topics that no one has ever heard before.²⁸

1.1.6 Herbert George Wells

Herbert George Wells has originally focused on depicting the real world and was writing short stories in magazines. Later on, one of his first sci-fi stories were “The Man of the Year Million” (1893), where he presents a discussion on the possible evolution of human race. He elaborated on some of the insights of Darwin’s theory of evolution that were crucial for the new evolution he suggested humans would undergo in his story.³¹ For people at that time, this newly evolved humans would look like aliens coming to destroy us.

This broadens the scope of science fiction by introducing complex questions about the human race and our future chances of survival in the face of evolution and inevitable change. The theme of evolution, in particular, is explored in many of Wells' later works.³³

H.G. Wells’ *The Time Machine* (1895) explores a distant future where humanity has split into two distinct species, the beautiful Eloi and the hideous, underground Morlocks, who prey on the Eloi at night. The story presents a stark division between the two, raising questions about class, evolution, and survival.³⁴

This reflects the social trends of late 19th century Britain, where industrialization and urbanization brought both progress and hardships. While the aristocracy remained influential, much of the political and economic power was shifting toward the rising

²⁷ Roberts, *The History of Science Fiction*, 135.

²⁸ Roberts, *Science Fiction*, 46.

³¹ Roberts, *The History of Science Fiction*, 144.

³³ Darko Suvin, *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre* (New Haven: Yale University Press, 1979), 63-64.

³⁴ Roberts, *The History of Science Fiction*, 144.

bourgeoisie, factory owners, bankers, and merchants. The growing desire for change was characteristic of the Victorian era, during which many social reforms were introduced.³⁵

The time machine in Wells' novel of the same name was seen by many critics as a strange and unsettling invention. More than just a technological marvel, it was interpreted as a powerful and potentially dangerous tool, almost like a weapon. The story is a satire disguised through time travel and fictional species, was direct and left little room for alternative interpretations, offering a sharp critique of social and class divisions.³⁶

This moment shifts the genre into a new direction, using detailed explanation as a narrative tool. Science fiction becomes a means to explore and comment on societal issues in a more analytical and imaginative way.

H.G. Wells' *The War of the Worlds* (1898) marked a moment in science fiction, introducing an alien invasion that would become a foundational theme in the genre. The novel's depiction of advanced extraterrestrial beings and their devastating attack on Earth set the stage for future sci-fi works, blending imaginative storytelling with a sense of existential threat.³⁹

In his novels, Wells creates worlds strikingly similar to our own, making the destruction of these familiar settings all the more impactful. He is not afraid to shatter these worlds, forcing readers to confront the fragility of humanity. This destruction sparks the notion of space exploration as a potential escape, highlighting the urgent quest to find a new world if our own is torn apart.⁴⁰

Many critics suggest that his works are rather allegories of the society than being sci-fi oriented.⁴¹ Nonetheless, he developed a foundational concept of time travel that has since been used in many other stories, such as *Doctor Who* (1996) and *Back to the Future* (1985). Without this contribution, this aspect of science fiction would not have been possible to explore.⁴²

³⁵ 'BBC - History : British History Timeline', accessed 1 December 2024, https://www.bbc.co.uk/history/british/timeline/victorianbritain_timeline_noflash.shtml#top.

³⁶ Roberts, *The History of Science Fiction*, 146.

³⁹ 'The War of the Worlds (Novel by H.G. Wells) | Summary, Analysis, Characters, & Facts | Britannica', 26 October 2024, <https://www.britannica.com/topic/The-War-of-the-Worlds-novel-by-Wells>.

⁴⁰ Barron, *Anatomy of Wonder 4*, 60.

⁴¹ Roberts, *The History of Science Fiction*, 148.

⁴² Sci-fi Lab and Ali Erkurt, 'H.G. Wells and the Birth of Science Fiction Literature', Substack newsletter, *Sci-Fi Lab* (blog), 21 January 2024, <https://scifilab.substack.com/p/hg-wells-and-the-birth-of-science>.

1.1.7 20th Century

In the 20th century, particularly before and during both World Wars, the science fiction genre split into two distinct branches, shaped by the prevailing mood of society. On one side, there was the looming threat of war, continuing during the Cold War, which led to dystopian visions of the future. On the other side, the excitement surrounding new technologies and medical advancements inspired more utopian ideals. Sci-fi authors often viewed war as both a destructive force and a potential catalyst for innovation. This dichotomy between dystopian and utopian perspectives ultimately evolved into the style of futurism.⁴³

As James suggest the 1930s saw the significant rise of "the pulps," affordable magazines printed on cheap wood-pulp paper, which replaced earlier low-cost novels. Titles like *Astounding Stories* and *Wonder Stories* offered thrilling tales of science fiction, adventure, and futuristic concepts to a wide audience. These popular magazines were foundational for the Golden Age of sci-fi. Later on the stories were often later published as a novels.⁴⁴

Most authors of the late 19th and beginning of 20th century were introduced to the public through these periodicals. Mostly popular in America due to the raising popularity of pop-culture. This was the beginning of the mass production of all speculative fiction.⁴⁶

Following the pulp era, another significant phenomenon was the Golden Age of science fiction, generally considered to span from 1938 to 1946. This period profoundly impacted American society and is particularly associated with the "Big Three" authors: Isaac Asimov, Arthur C. Clarke, and Robert A. Heinlein.⁴⁷

1.1.8 Isaac Asimov

Isaac Asimov is widely regarded as one of the greatest science fiction authors of all time. His work went beyond just technical and space-related inventions, he even explored the deep connections between technology, science, and human behaviour. Asimov believed that individuals could not change the destiny of society as a whole, emphasizing the broader forces that shape our world.

⁴³ Roberts, *The History of Science Fiction*, 156-157.

⁴⁴ James, *Science Fiction in the Twentieth Century*, 36.

⁴⁶ James, 35.

⁴⁷ James, 7.

According to Suvin, many of Asimov's novels are rooted in the structure of detective stories, particularly in the way he constructs the plot. What makes his work stand out is how he guides the reader through a logical investigation, often similar to the process of a detective. This analytical style allows Asimov to examine complex ideas in depth, almost as if he were testing his own theories within the narrative.⁴⁸

One of his most popular stories and considerably one of the best sci-fi short stories of all time, as Roberts says, is *Nightfall* (1941).⁴⁹ It narrates a story about a planet where sun dies out every 2000 years, and the inhabitants of the planet are powerless against the collapse of the sky. The scientists are eager to understand how to prevent it, but soon they realize that it is inevitable. This influenced how they perceived the end and also their entire life before the collapse.⁵⁰

Another well received and very important book for the development of sci-fi is *I, Robot* (1950) which is a collection of his short-stories says Bould et al.⁵¹ This book brings new outlook on the robots within the genre.⁵²

As James suggests, Asimov's books were very complex thanks to the authors ability to combine deep knowledge of mathematics, psychology, history and other studies and create complex world with functionals laws, physics and development.⁵⁴ This has led to his success and overall recognition in the field of sci-fi. His ability to not only create and describe how it works but fill in the blank spaces that are necessary for the reader to fully imagine the world.

These tendencies resulted into the book series *Foundation*. (1951-1953), which portrays falls of civilization similar to the one from real history, Roman empire.⁵⁵ His works often lean toward utopian science fiction, as he typically portrays technology and robots as tools to benefit humanity. However, in some of his writing, he also warns about the potential dangers of misusing new technologies.

⁴⁸ Suvin, *Metamorphoses of Science Fiction*, 72.

⁴⁹ Roberts, *The History of Science Fiction*, 197.

⁵⁰ Roberts, *The History of Science Fiction*, 197.

⁵¹ Bould, Butler, and Vint, *The New Routledge Companion to Science Fiction*, 144.

⁵² Roberts, *The History of Science Fiction*, 198.

⁵⁴ James, *Science Fiction in the Twentieth Century*, 66.

⁵⁵ James, *Science Fiction in the Twentieth Century*, 67.

1.1.9 Arthur C. Clarke

Arthur C. Clarke is known for his optimistic view of science as a force capable of saving humanity, similar to Asimov. His topics are supporting new scientific progress. According to Aldiss and Wingrove his approach is much more hopeful and rather than dystopian fiction he wrote beautiful utopia where people, together with technology cherish and bloom on every planet.⁵⁶

It was a welcomed change from the usual post war literature after the second world war. People were used to seeing the decomposition of the whole cities, countries and of course their own society and community.

One of his most significant novels is definitely *2001: a Space Odyssey (1968)*, which is interesting for its scientific preciseness and predicting the future as the novel discusses the issue with humanoid voice capable of most human interaction and action. The intention was initially aimed at showcasing the benefits of modern technologies. It was a realistic vision, especially in hindsight, considering how prominent artificial intelligence has become in today's world. At the time, it may have seemed like a wild guess, but from today's perspective, he was heading in a remarkably accurate direction.⁵⁷

The novel revolves around the unusual voice “HAL 9000” that holds and controls an astronaut inside of the space ship. This voice, an entity, has its own consciousness and almost destroys the whole mission.⁵⁸

Although the plot suggests a dystopian reality, the tone of the writing remains optimistic. As Clarke explores space, he maintains a hopeful outlook on the possibility's humanity will create and the new horizons it will uncover.⁵⁹

1.1.10 Robert A. Heinlein

Robert A. Heinlein was deeply convinced that society as a whole—including its systems, nations, institutions, and collective beliefs would inevitably need to change at some point. Though this might sound like total destruction, he viewed it as a natural evolution.⁶¹

⁵⁶ Brian W. Aldiss and David Wingrove, *Trillion Year Spree: The History of Science Fiction* (London: Grafton Paladin, 1988), 382.

⁵⁷ Roberts, *Science Fiction*, 115.

⁵⁸ Peter Krämer, *2001*, BFI Film Classics Ser (London: BFI Publishing, 2010) 14-15.

⁵⁹ Krämer, 16.

⁶¹ James, *Science Fiction in the Twentieth Century*, 57.

As we can see in his work *Stranger in a Strange Land* (1961), which follows the story of a man raised as an outsider not on Earth, but on Mars, and goes to Earth to build a rapport with human beings here, he promotes free love and breaking the status of intimacy and topics connected to sex. Although the book gained popularity among university students and hippies for the ideas it presented, it was not accepted well by the older generation and its established norms. Some critics suggest that the novel also reflects a shift in societal values, portraying a form of masculinity that masks a new social order, mirroring changes occurring in many places at the time.⁶²

Both approaches support his ideology of new society, either by pointing to what is happening or how a new system could look like.

His style definitely brought readers to the dystopian future showing them that not all what is known and generally accepted must stay forever and that changes will likely occur. These beliefs, order and moral rules we nurture now, do not necessarily have to have much value in the future.

1.2 Main Concept of Sci-fi, Cognitive Principle and Novum

In this section I will explore the defining characteristics of the modern science fiction genre and highlight its most significant features as there is no universal definition. To provide a clear understanding of sci-fi, I will also introduce the broader context of speculative fiction. Even though the genre is relatively new, it has undergone significant evolution, which makes it essential to first examine its historical development.

As Oziwicz mentions, sci-fi is considered to be part of the speculative fiction, which is a category describing genres that speculate about possible future. It includes the genre of sci-fi, fantasy and horror and their hybrids.⁶³

It's important to note that, historically, speculative fiction was not originally a subgenre of science fiction, it was the other way around. Science fiction gradually emerged as a branch within the broader framework of speculative fiction⁶⁴

According to Suvin, science fiction is not defined solely by science itself, but rather by its speculative approach within a scientific or cognitive framework. This means that even

⁶² Roberts, *Science Fiction*, 64.

⁶³ Marek Oziwicz, 'Speculative Fiction', in *Oxford Research Encyclopedia of Literature*, by Marek Oziwicz (Oxford University Press, 2017), <https://doi.org/10.1093/acrefore/9780190201098.013.78>.

⁶⁴ Oziwicz.

when SF critiques or imagines alternatives to current scientific paradigms, it still operates within the logic and methods of scientific reasoning. The genre also includes for example human or social studies, which try to rationally and systematically understand the reality.⁶⁵

The speculative aspect, projecting alternative realities or futures in the stories, becomes a defining feature of the genre, which shows the similarity and importance of putting the sci-fi into the context of speculative fiction. The cognitive estrangement is what differentiates sci-fi from other stories within speculative fiction as everything imagined needs to be logically explained.

Early attempts, as James completes the Suvin's thought, to name the genre varied, with terms like 'scientific fiction' appearing in *Science and Invention* (1922) and later 'science fiction' and even 'scientifiction' being used interchangeably in 1930s pulp magazines. What unites these names is the genre's unique connection with science as way of understanding the world.⁶⁸

Another point Suvin describes as vital for the sci-fi is that anything that happens even in the name of science needs to be properly explained and described.⁶⁹ Suvin uses the term cognitive estrangement to describe the defining style of the science fiction genre. The 'cognitive' aspect refers to the use of real science and rational thinking to approach problems, situations, or entire worlds logically. Estrangement, on the other hand, introduces something new or unfamiliar, such as an alien civilization or a futuristic element. What sets science fiction apart from other forms of speculative fiction is that these unfamiliar elements are not presented as magic or mystery; instead, they are grounded in plausible explanations, often linked to real scientific principles or theories.⁷⁰

The third point which Suvin makes is that the science has: "open-ended corpus of knowledge" in which any new story or idea that have some scientific basis can serve to be marked as sci-fi.⁷²

All these remarks lead to Suvin's open and short definition of sci-fi: "SF is distinguished by the narrative dominance or hegemony of a fictional "novum" (novelty, innovation) validated by cognitive logic."⁷³

⁶⁵ Suvin, *Metamorphoses of Science Fiction*, 67.

⁶⁸ James, *Science Fiction in the Twentieth Century*, 9.

⁶⁹ Suvin, *Metamorphoses of Science Fiction*, 67.

⁷⁰ Suvin, *Metamorphoses of Science Fiction*, 7-9.

⁷² Suvin, 68.

⁷³ Suvin, 63.

As Suvin enlarged the idea brought by Ernst Bloch, that the *novum* is a literary device which connects the real world with the imaginary. In the meaning of a main functional system which allows the whole imaginary world to work logically and to be able to be studied and think of in a scientific manner. It typically presents a novelty introduced into the world, something imaginary yet still subject to cognitive verification. The narrative often centres on exploring how this new thing is possible, how it functions, and how it can be used or understood.⁷⁴ Novum is not supernatural it is still rational, even though it may seem strange at first. Roberts says:

Balancing ‘cognition’ and ‘estrangement’, or the continuities and discontinuities of the SF text, becomes the index of success of the SF text. More than this, it seems that this balance is focused through the novum. In other words, implicit within these three definitions is a sense of SF as a symbolist genre, one where the novum acts as symbolic manifestation of something that connects it specifically with the world we live in, the attempt to represent the world within reproducing it in its own terms.⁷⁵

In other words, the definition of sci-fi is not clear and straight forward, but it should be connecting something new, extraordinary and strange with the real world by explaining and applying the existing laws of nature and real technologies and their functions. Novum is this engine or instrument which the imaginary world revolves around, but it is not magical, it is based on logic.

From more factual point of view the genre could be identified as Oxford dictionary suggest: “a type of book, film, etc. that is based on imagined scientific discoveries of the future, and often deals with space travel and life on other planets.”⁷⁶

There are also strong genre expectations from the reader. When an author sets out to create a new work, they are expected to take existing conventions into account, like the commonly accepted rules about time travel, while still offering fresh ideas and original concepts.⁷⁸

Which is followed by the definition suggested by Aldiss and Wingrove. They claim that sci-fi has no history to this day because every work is different, and most of the works are

⁷⁴ Suvin, *Metamorphoses of Science Fiction*, 63-67.

⁷⁵ Roberts, *Science Fiction*, 14.

⁷⁶ ‘Science Fiction Noun - Definition, Pictures, Pronunciation and Usage Notes | Oxford Advanced Learner’s Dictionary at OxfordLearnersDictionaries.Com’, accessed 29 January 2025, <https://www.oxfordlearnersdictionaries.com/definition/english/science-fiction?q=science+fiction>.

⁷⁸ Roberts 3.

completely irrelevant to each other. For example, the pulps having nothing in common with writing of George Orwell or Aldous Huxley. As this genre is, according to them, completely in the hands of the readers and it is created with the regard to their expectations.⁸²

This attitude, even though seen as a contradiction to the first sign is similar to what Suvin suggests. It is about the principle of thinking, creating and explaining with scientific preciseness. Which Aldiss and Wingrove describe from the point of view of the reader and Suvin from the point of view of a writer.

In the analyses of the book, this thesis will deal with the Suvin's view of the genre via novum and cognitive estrangement.

The topics are not the defining aspect of the genre of sci-fi, although there are some topics that sci-fi usually addresses. The ideas are widespread as can be seen listed in chapters of the part Science fiction Praxis in Bould et al. book. Ideas and subgenres for the stories range from the topic of Silicon Valley culture with all the company's creating evolution in technology and science. To the alternate history of our world shown on different animal species, being and creatures. Continuing to political science fiction and different types of regimes, debating and warning about what could happen. Other common subgenres are environmental utopia and dystopia, caused by human work or natural disaster. Sci-fi often deal either openly or secretly with a lot of ethic and social issues such as disabled people and reaction of people to them, questions about feminism and acceptance of minorities, totalitarian regimes and stories that are used as a warning. Interesting topics are definitely geography and urban landscape created by humans or machines, alongside with problems that occurs in them. It cannot be omitted the more traditional topics as time travelling, space exploration, living on a different planet and many others.⁸⁶

Sci-fi is commonly distinguished into two branches, hard sci-fi and soft sci-fi. Soft sci-fi includes all of the social studies, human studies etc.⁸⁷ The analysed books incline more to the hard sci-fi, nonetheless some aspect of soft sci-fi are in the books as well. As Nicholls and Clute says:

This not very precise item of sf terminology, formed by analogy with hard sf, is generally applied either to sf that deals with the soft sciences or to sf that does not deal with recognizable science at all, but emphasizes human feelings. The contrasting of soft sf with hard sf is sometimes illogical. Stories

⁸² Aldiss and Wingrove, *Trillion Year Spree*, 15.

⁸⁶ Bould, Butler, and Vint, *The New Routledge Companion to Science Fiction*.

⁸⁷ Suvin, *Metamorphoses of Science Fiction*, 68.

of psi powers or supermen, for example, have little to do with real science, but are regularly regarded by sf readers as hard sf. The new wave was generally associated with soft sf; cyberpunk falls somewhere between the two.⁸⁸

It is more about the feeling of the reader where to put the piece and how to label it. The difference is commonly visible when it is compared to undebatable hard sci-fi piece.

Hard sci-fi is more comprehensible and unambiguous as Roberts summarizes Hartwell's *The ascent of wonder* (1997) pages 30-34: (1) 'Hard SF is about the beauty of truth . . . about the emotional experience of describing and confronting what is scientifically true.' (2) 'Hard SF feels authentic to the experienced reader when the way things work in the story is scientifically plausible.' (3) 'Hard SF relies, at some point in the story, on expository prose rather than literary prose, prose aimed at describing the nature of its particular reality.' (4) 'Hard SF relies on scientific knowledge external to the story.' And (5) 'Hard SF achieves its characteristic affect essentially through informing, by being, in fact, didactic.'⁸⁹

1.3 Worldbuilding

As with other branches of speculative fiction, world-building is crucial in science fiction, as highlighted in the previous chapter. To craft a compelling and believable sci-fi narrative, the author must introduce a novum around which the entire world revolves.

Once the author creates all of this the next step is to explain it to the reader. Regardless of the size of the world, the explanations need to be a continuous process to welcome the reader in this world. This principle is generic for all of the speculative fiction stories.

The worlds the authors build need to stand on beliefs and philosophical basis, as we as humans tend to see our real world as a logical one, with coherent laws and physics, with functional nature and its systems. We are used to how our things work. As Wolf suggests – the narrative is demanded to be gentle with the readers, the worlds need to have some logic and rules that apply in every scenario and there are no exceptions.⁹⁰

⁸⁸ John Clute and Peter Nicholls, eds., *The Encyclopedia of Science Fiction* (New York: St. Martin's Press, 1993), 1131.

⁸⁹ Roberts, 188.

⁹⁰ Mark J. P. Wolf, *Building Imaginary Worlds: The Theory and History of Subcreation* (New York: Routledge, 2013), <https://doi.org/10.4324/9780203096994>, 17-20.

What is important as well to mention the “World” is not always meant as the whole world, it could be just a place as Wolf explains on the example of in the depth of African jungle. The level of how much is the world or place complex also differs.⁹¹

According to Wolf, the important factor is not to break the rules of building, namely immersion, absorption and saturation.⁹² These three points are necessary for worldbuilding of the especially successful sci-fi world, as the reader needs to be able to absorb the information at certain speed and not to be overwhelmed by the book.

Starting with immersion, which shows how much is the reader already soaked in the story and how much attention are they still giving. Secondly absorption. which includes more of the creative part of our mind. Readers need to be able to reconstruct the world in their mind from the information given. Lastly saturation. This term describes that our mind can contain just limited amount of information at once. If more information is provided our mind becomes overstimulated and cannot form a coherent picture of the place.⁹³

To describe the world and the novum it is needed to follow these principles and not violate them. The audience should be able to follow the story line and the invention as well.

Many parts can be said through stories of the main protagonist or other people, it is more natural than to let only the narrator do the work. It could have a negative effect as well. As according to Wolf, the general advice for a new write is not to include anything that slows down the story as the worldbuilding itself does it.⁹⁶

In the practical part I will follow the Andy Weir’s style of worldbuilding and explanation of inventions, states and novums that are appearing in his books.

⁹¹ Wolf, 25.

⁹² Mark J. P. Wolf, ed., *Revisiting Imaginary Worlds: A Subcreation Studies Anthology* (New York: Routledge, 2017), <https://doi.org/10.4324/9781315673363>, 347.

⁹³ Wolf, 347.

⁹⁶ Wolf, *Building Imaginary Worlds*, 25.

2 ANDY WEIR AND HIS LITERARY WORKS

Andy Weir was originally a software engineer. This experience has likely contributed to the distinctive style of his writing.⁹⁷

In several interviews, he mentioned that his writing was heavily influenced by the Big Three of science fiction: Isaac Asimov, Robert Heinlein, and Arthur C. Clarke. Describing himself as a 'nerd,' he explained that his path into sci-fi felt inevitable as his father was a particle physicist, his mother an electrical engineer, and his father had been a devoted sci-fi fan long before him. Growing up, he read sci-fi regularly.⁹⁸

As mentioned in the subchapter on Isaac Asimov, Weir employs a similar system of plot logic, comparable to that found in the *Foundation* series. Despite facing seemingly unsolvable and unimaginable situations, Weir's characters rely on their intelligence, skills, and logic to achieve the desired outcome. Like Asimov, Weir also gives careful attention to the technical details in his storytelling

Weir's scientific background led to his first job at just 15, where he learned to program computers for data analysis. This early experience shaped his distinctive writing style, giving him the ability to explain complex scientific and physical concepts to readers with little or no background in the subject.⁹⁹

Clarke has influenced Weir in many other aspects. Especially in *The Martian* (2014). His character proves many times that he obeys and follows the rule once conducted by Clarke: "sufficiently advanced technology is indistinguishable from magic."¹⁰⁰ Weir continues with this approach in all of his books as most of them are written within this genre.

Viewed through a 20th century lens, he aligns with a utopian vision of the future, embracing technology and space exploration with optimism. His protagonists often begin in difficult, seemingly hopeless situations, yet over time, they manage to overcome most of the challenges they encounter.

⁹⁷ 'Andy Weir', accessed 24 March 2025, <https://andyweirauthor.com/#about>.

⁹⁸ John Joseph Adams, 'Interview: Andy Weir', *Lightspeed Magazine*, 22 December 2015, <https://www.lightspeedmagazine.com/nonfiction/interview-andy-weir/>.

⁹⁹ GEORGIA ROWE | Correspondent and Bay Area News Group, 'Andy Weir's Self-Published "The Martian" Travels through Space to Best-Sellerdom', *The Mercury News* (blog), 10 March 2014, <https://www.mercurynews.com/2014/03/10/andy-weirs-self-published-the-martian-travels-through-space-to-best-sellerdom/>.

¹⁰⁰ Arthur C. Clarke, *Profiles of the Future: An Inquiry into the Limits of the Possible*, Rev. ed (New York: Popular Library, 1977), 39.

Weir himself said that Mark Watney, main character of *The Martian* is similar to his personality. The same applies to his other bestseller *Project Hail Mary*. As the character is smart, edgy and sarcastic in every situation.¹⁰¹

Another noteworthy point is that Weir initially began self-publishing his stories chapter by chapter on his blog. This places the original release of *The Martian* around 2011, when both the blog and the story gained significant popularity. He later sold the book on Amazon Kindle, but it was not until 2014 that he sold the publishing rights to Crown Publishing. His earlier attempts at publishing books had not met with success.¹⁰²

As for his other stories, apart from *The Martian* and *Project Hail Mary*, which will be analysed in detail later, the short story *The Egg* (2009), which is about 1000 words long, is worth mentioning. This short story is about the moment of one's own death, and deals with the heavy topics of reincarnation, the attached soul and death in a very short story time.¹⁰³ This was part of the success, as the text was easily copied and shared across platforms.¹⁰⁴

I would like to mention two other books, one of which is *Artemis*. The story follows a crime thriller situated on the Moon in a city called Artemis. With many features of the sci-fi and definitely similar narrative style as in *The Martian*.¹⁰⁵

The second one is *Cheshire Crossing* (2019) which was created in the collaboration with the illustrator Sarah's Scribbles as a graphic novel. It follows the story of Wendy, Alice and Dorothy into multiverse in order to save it.¹⁰⁶

¹⁰¹ Correspondent and Group, 'Andy Weir's Self-Published "The Martian" Travels through Space to Best-Sellerdom'.

¹⁰² Andy Weir, 'How Science Made Me a Writer', Salon, 12 February 2014, https://www.salon.com/2014/02/11/how_science_made_me_a_writer/.

¹⁰³ 'The Egg', accessed 24 March 2025, https://www.galactanet.com/oneoff/theegg_mod.html.

¹⁰⁴ Adams, 'Interview'.

¹⁰⁵ 'Andy Weir'.

¹⁰⁶ 'Andy Weir'.

3 THE MARTIAN AND PROJECT HAIL MARY: THE ANALYSIS

This section of my bachelor thesis focuses on the analysis of two selected novels: *The Martian* and *Project Hail Mary*. I will compare them in terms of science fiction elements, themes, and motifs. At the beginning, I will provide a brief summary of each story.

3.1 Brief Summary of the Book *The Martian*

The summary of the story is based on a reading of *The Martian*.

The story follows the lives of the astronauts from the third expedition to Mars. The mission was originally planned to last just 31 sols, Martian days, but for Mark Watney, it becomes an extended stay of over 18 months by Earth's calendar. During a severe sandstorm, the crew is forced to abort the mission, and Watney is struck by an antenna, presumed dead by his teammates, leaving him behind.

He survives and begins preparing for a much longer stay than originally planned. Relying on his intelligence, sense of humour, resilience, and broad knowledge of biology, physics, chemistry, and mathematics, he manages to extend his chances of survival. He successfully grows crops, synthesizes water, and modifies the rover to travel over 4,000 kilometres across Mars. Throughout it all, Mark remains calm and mentally stable – an impressive feat for someone stranded alone on the Red Planet. He survives long enough to be picked up by their mother ship, the *Hermes*, and his original crew on its orbit of Mars.

Weir's literary genius demonstrates an ability to explain and demonstrate complex and often highly theoretical principles of science to a largely unscientific audience, allowing them to enjoy and learn about science while reading his books.

The story is told through a shifting narrative style, alternating between Mark's mission logs, typically documented day by day as he experiences life on Mars – and the perspective of the NASA space centre on Earth. Occasionally, there are introspective moments from the rest of the crew aboard the *Hermes*, currently orbiting Mars.

3.2 Brief Summary of the Book *Project Hail Mary*

This subchapter is based on the reading of the novel *Project Hail Mary*.

Project Hail Mary centres on the protagonist, Ryland Grace, who wakes up with no memory of his location or the reason for his presence. The narrative alternates between his current reality aboard a spacecraft and the gradual return of his memories, which unfold over

time. His mission is to save Earth from a new organism that is consuming the sun's energy, threatening to destroy the planet. He is sent aboard the ship Hail Mary to the distant Tau Ceti system, where scientists on Earth have discovered the only star unaffected by the organism, known as Astrophage.

Upon arrival, Grace learns that he is the sole survivor of the original three-person crew, yet he has no memory of himself, his past, or his mission. The drug administered to him allows him to retain his scientific knowledge and skills. As time passes, Grace uncovers his task: to find a way to eliminate the Astrophage from the solar system.

He is not alone in his search for a solution. He encounters a highly developed being from another system, from the planet Erid, whom he names Rocky. Together, they develop a means of communication and cooperate to tackle the shared problem. They find a solution for their dying stars by developing another organism to consume the Astrophage and set course for their respective home planets.

After some time, Grace realizes a significant issue they had not anticipated. He sends only probes with the organism back to Earth and changes course to help Rocky. Unable to resolve his own problem, Grace assists Rocky and heads to Erid, believing he will die soon after arrival. However, he does not. The Eridians manage to provide for his needs, and as a former Earth teacher, Grace begins teaching students on Erid, unsure if he will ever return home.

3.3 Subgenre

Both of the novels tend to incline to the Hard sci-fi. As Roberts says this subgenre deals with most of the scientific inventions. It is necessary to know the origin behind the main idea, feature, and novum, in order to be elaborated and examined. What is also important is to scientifically prove and explain the system.¹⁰⁷

The features of hard science fiction are quite visible in the novel *The Martian*, mainly in the problem solving of survival on Mars. A good example are his attempts to calculate the amount of farmland and food he needs to survive until someone comes to pick him up. As:

My best bet for making calories is potatoes. They grow prolifically and have a reasonable caloric content (770 calories per kilogram). I'm pretty sure the ones I have will germinate. Problem is I can't grow enough of them. In 62 square meters, I could grow maybe 150 kilograms of potatoes in

¹⁰⁷ Roberts, *Science Fiction*, 187.

400 days (the time I have before running out of food). That's a grand total of 115,500 calories, a sustainable average of 288 calories per day. With my height and weight, if I'm willing to starve a little, I need 1500 calories per day.... So now I'll start starving to death on Sol 490 instead of Sol 400. It's progress, but any hope of survival rests on me surviving until Sol 1412, when Ares 4 will land.¹⁰⁹

Mark is trying to calculate how many days he has left, and he is doing this without emotion. He counts the calorie intake of a real person, with sources readily available as he is botanist. He also has to do experiments with bacteria, and he has to choose an approach to create more fertile soil. All this is counted in the real metric system and the possibility of recreating it by the real scientists.

Another moment when the crew of the Hermes ships will have to calculate and, more importantly, act according to the laws of physics is when they try to catch the food supply probe so that they can go back into orbit around Mars and pick up Mark along the way:

Aye, Commander." "Distance 43 meters, velocity 2.3 meters per second," Johanssen called out. "All stats nominal," Martinez reported. "Slight rotation in the probe," Johanssen said. "Relative rotational velocity is 0.05 revolutions per second." "Anything under 0.3 is fine," Martinez said. "The capture system can deal with it." "Probe is well within manual recovery range," Beck reported. "Copy," Lewis said. "Distance 22 meters, velocity 2.3 meters per second," Johanssen said. "Angle is good."¹¹⁰

As the crew operates in space, their velocity, rotation, and other parameters must precisely match those of the target object in order to successfully intercept it. This moment is critical to the entire story, as the success of the mission depends on it. If they fail to catch the probe, the crew will not have enough food to survive until the next opportunity to return to Earth and they will be unable to rescue Mark. Should this scenario become reality, the crew would face a fate of sacrificing themselves so that one member, chosen logically based on being the youngest and smallest, could survive by consuming their food rations. This harrowing choice reflects the astronauts' responsibility not only for their own lives but for the mission and humanity as a whole.

Both novels share a similar approach to science, technology, and narrative style. Interestingly, the scientific background of the protagonists is also the same, both Grace and Mark are originally botanists. A central theme in both stories is scientific accuracy, along with a strong focus on problem-solving and survival. In both cases, the protagonists face

¹⁰⁹ Andy Weir, *The Martian*, (New York: Crown Publishers, 2014), PDF ebook.

¹¹⁰ Weir, PDF ebook.

overwhelming odds, with little chance of survival, making their ingenuity and resilience key to the narrative. To exemplify *Project Hail Mary*:

It's like...getting to the scales of mass conversion. $E = mc^2$ kind of stuff. These tiny dots have more energy stored up in them than remotely makes sense." "Well," she said. "They did just come from the sun. And the sun is losing energy."¹¹¹

This part dispels the early contact with Astrophege, and its ability to keep energy as one of the biggest medium on the planet. Taking in account the Einstein's famous equations of energy and mass. This moment turns out as significant for the whole continuing if the book, as it allows people to send astronauts 12 light years away.

Another example could be: "Rocky reduced our cruise velocity to put us in a stable orbit about 1 AU from Tau Ceti. That's where he left the Blip-A."¹¹²

Even though they are in the system we as humans have never explore in person, he uses the Earth metrics. To make this easier as Grace is travelling at this point with highly developed race, alien, the fact he chooses to continue with Earth system is explained in the way that Rocky is better at recounting, have photographic memory and does not forget as much as Grace who is a human, and does not have these abilities. Therefore, Rocky suggests to use the Earth system and allows *Project Hail Mary* to be more comprehensive and also realistic as a new alien metric would have no proof of working.

Although there are some differences in the sub-genre, *The Martian* is strictly using the scientific features and processes that would be possible in several years (almost now, taking in account that *The Martian* was original written in 2011), *Project Hail Mary* addresses more speculative approach to the first contact with aliens, building the entire possibility once mentioned to Astrophage as fuel. The writer cannot be certain that this would look exactly as he imagined.

3.4 Topic

This thesis has already suggested that the importance of the topic in the sci-fi is not as big as it could be expected at first. Although I would like to mention the similarities of both of the books.

¹¹¹ Andy Weir, *Project Hail Mary*, (New York: Ballantine Books, 2021), PDF ebook.

¹¹² Weir, PDF ebook.

Both novels are heavily focused on science and problem solving, with this approach almost building the whole story, and as the plot is full of problems, each of them, if solved, brings the story and the main character closer to the end of their journey, in the end happily. This brings up another theme that runs through both books, survival. In *The Martian*, this theme revolves almost entirely around Mark Watney and his ability to survive and save himself. Though, as mentioned several times, even the Hermes crew is not completely safe, as space travel comes with a generous amount of danger, such as:

They have another ten months on their trip home,” Teddy explained. “Space travel is dangerous. They need to be alert and undistracted. They’re sad that they lost a crewmate, but they’d be devastated if they found out they’d abandoned him alive.¹¹³

In *Project Hail Mary*, Grace holds not only his own survival in his hands, but that of the entire planet. However, this immense responsibility is not immediately emphasized, as both the reader and Grace gradually come to realize that his presence in space was not voluntary. As the story continues, it becomes clear that the success of the mission is vital not only for Earth’s survival but also for that of the Eridians and potentially other civilizations as well.

The topics of the books are quite different from the point of view of the bigger picture as *The Project Hail Mary* covers the issue of the first contact with “aliens”, extinction of the whole civilization, language barriers and possibility of another life from the same source as an idea of common origin of many other species distributed around the systems long before any space exploration. On the other hand, *The Martian* focuses more onto the topic of team working, integrity, and fragility of the life in a space. Mark has a new catastrophe almost every day. However, when you read the novels, the situation feels really similar to each other. As both are males, trying to survive almost on their own and solve the problem from the point of view of biology as their major and then learned skills through the astronauts training and experience. The reason for the comparable feel of the characters and their personalities is probably as Weir mentioned in one of his interviews described in the chapter 2 that he feels like Mark, clever, solution-oriented person with good humour.

This connection between the author and his characters helps explain why both novels feel alike. Because Weir infuses his protagonists with aspects of his own personality, their reactions, humour, and approach to problems feel authentic and consistent across both books.

¹¹³ Weir, *The Martian*, PDF ebook.

As a result, readers experience a familiar narrative voice and a character dynamic, even though the settings and situations differ.

3.5 Novum

As previously mentioned, the similar novum in these books is the application of science and biology, and what a person can achieve with just knowledge and skill. This emphasizes the importance of learning and studying, as Weir repeatedly highlights in his books, suggesting that the concepts are based on common school knowledge. As seen in *The Martian*:

Remember those old math questions you had in algebra class? Where water is entering a container at a certain rate and leaving at a different rate and you need to figure out when it'll be empty? Well, that concept is critical to the "Mark Watney doesn't die" project I'm working on."¹¹⁵ Or in the *Project Hail Mary*: "...is 35.44 degrees. Okay, some basic math should handle this. I bring up the Utility panel on the main screen and launch the calculator app. Something 217 meters away is occupying 35.44 degrees of the view. Presuming the radar can see in all 360 degrees (it would be a pretty cruddy radar if it couldn't) ...I type some numbers into the calculator to do an ARCTAN operation, and: The ship is 139 meters long. Roughly."¹¹⁶

It highlights the importance of learning. In the second book, this is further emphasized by the fact that one of the top scientists enjoys teaching and views it as essential to impart as much knowledge as possible to his students. By the end of the novel, Grace is actually teaching a class on Eridian science.

The main thing that allows Mark to tell his story is the ability of humanity to travel to Mars and not just jump in and out, but to have a mission in the first step, the third to be precise, of more than 30 days. The knowledge acquired by mankind, and in particular by NASA, the space agency that is behind the Ares mission, during the first experiments makes it possible to create an environment and a technical system that will allow mankind to survive on Mars. As this excerpt shows, the construction of the Hab for people to maintain their life on Mars and the amount of equipment put on Mars before the arrival of the crew. As it was not only the Hab, their shelter, but also 2 rovers, MAV, modul created and sent to Mars for the return journey, spare parts, pop-up tents to rovers and thinking of most of the scenarios that could happen.:

¹¹⁵ Weir, *The Martian*, PDF ebook.

¹¹⁶ Weir, *Project Hail Mary*, PDF ebook.

The airlocks on the Hab are much larger and completely different from the airlocks on the rovers. When you think about it, there's really no reason to attach a pop-tent to the Hab. Unless you're stranded on Mars, everyone thinks you're dead, and you're in a desperate fight against time and the elements to stay alive. But, you know, other than that edge case, there's no reason.¹¹⁷

Another key factor in Mark's survival was his knowledge of botany and biology, particularly his ability to grow crops using only bacteria and creating soil from Mars dust. Weir devotes significant time to carefully explaining how Mark accomplishes this, with detailed descriptions of the potato-growing process. This ties into themes from Weir's other book, where the issue of a dying sun is also caused by a biological problem, an organism consuming the sun's energy.

The novum of *Project Hail Mary* is much more abstract. It is the existence of different species in the cosmos and the ability to turn one species into a fuel. Also, the cooperation of another intelligent species with humans to solve the problem together, because with the current technologies neither of them would be able to do it. They needed each other to save both planets. This brings thoughts back to Wells and his focus on Darwinian theory, as one species is always looking for a way to survive, even if it means destroying the other. As both humans and Eridians choose to destroy the organism *Astrophage* instead of looking for other solutions to the dying of the sun. "Maybe this intelligent alien species invented *Astrophage*. Maybe they genetically engineered it specifically to "grow" spaceship fuel. The ultimate in solar power. Maybe once I explain what's happening to Earth, they'll have a solution."¹¹⁸ his part shows the line of thought that another species could be used as a fuel, or even that it could be genetically engineered to be a fuel. There is nothing of the sort in *Martian*. When Mark talks about aliens, it is only in a sarcastic manner.

The main crisis caused by the *Astrophage* was the global cooling of the planet. While today's concerns focus on the opposite, global warming, the story serves as a warning about the importance of maintaining Earth's natural balance and temperature to ensure our survival and preserve the planet.

Very important tool is the usage of the drug blocking Grace's memories, the reader suspects that something is not correct with his mind, but it is not until the last part of the book that he realizes what was causing it: "How do I know all that space stuff? I just know

¹¹⁷ Weir, *The Martian*, PDF ebook.

¹¹⁸ Weir, *Project Hail Mary*, PDF ebook.

it. It feels like second nature—information I use all the time. Maybe I'm an astronomer or a planetary scientist. Maybe I work for NASA or ESA or—"119

As it was mentioned in the chapter Andy Weir, the author tends to see the future as positive and the problems as a mere inconvenience as he generates new ideas every time something goes wrong. Even the concept of the whole Earth helping and financing the Hail Mary ship or the interest of saving one astronaut from Mars gives humanity great credit and belief that the problem is solvable when people are generating effort together.

3.6 Cognitive Estrangement

As Suvin suggests, and as described in the previous chapter, the cognitive estrangement relies on the ability of the writer to mix the known science and principles with new ones, even if only imagined ones, to the point where the reader is not disturbed by any logical errors or impossibilities.

In *The Martian* is this principle used in the part where scientific process and procedure are explained and there is a part of the now unrealistic space travelling blended into our reality. This correlates with what readers expect. The hyper scientific explanation in this novel leads the reader to the conclusion that this is possible which is the greatest achievement of a writer, to make his imaginary things as natural and realistic as possible. Like the situation when Mark retrieves the old roving probe Pathfinder and it is still sending the signal and he is able to reprogram it to work with his rover radio. It is probably unrealistic, but at the moment we cannot say so: "...hecks on Hab equipment, and read some Poirot. Finally the time came! CNHAKRVR2TLK2PTHFDRPRP4LONGMSG Yeah. Took me a minute. "Can hack rover to talk to Pathfinder. Prepare for long message."120 This is exactly what the authors are referring to with cognitive estrangement. Reprogramming the 90s era radio likely would not be possible, as the system has been unused for a long time, and modern computers now run on different kernels, some of which may not even function correctly for this task. The wavelength would need to match, and even if NASA managed to locate all the old machines, successfully repair them, and get them running, the chances that Pathfinder and its antennas have not been completely destroyed are very small.

When discussing the scientific accuracy in *The Martian*, it's important to emphasize how precisely Andy Weir portrays the realities of space travel, especially the amount of time

¹¹⁹ Weir, PDF ebook.

¹²⁰ Weir, *The Martian*, PDF ebook.

it takes. Weir describes realistically the long durations involved; he carefully outlines how even missions within our solar system can take years. For example, the Ares 3 crew's attempt to rescue Mark Watney extended their mission by more than a year, simply due to the complex orbital mechanics and distances involved. Additionally, the months spent traveling to Mars just to spend around 30 days on the planet's surface shows the scale and commitment required for such expeditions. This attention to detail adds realism to the story and reminds readers of the true challenges that come with interplanetary travel.

A similar emphasis on time and distance in space travel appears in *Project Hail Mary*, where the journey to Tau Ceti spans an even longer distance than a Mars mission. The novel highlights the challenge of keeping astronauts alive during a travel lasting several years, long enough that remaining conscious the entire time would be impractical and dangerous. As a result, the team of scientists in the story works to develop methods on how to effectively put the astronauts to coma. Once again, Andy Weir approaches this aspect with scientific precision, carefully calculating the time required for such mission.

On the other hand, the precise description of the surface of Mars, since it is not fully known what could be there and what is not, Mark operates with the fact that everything is known to the detail and the only unexpected things happen because the technology is not built to last longer than the mission time. He operates with real maps and knowledge of the atmosphere to the point that he relies upon and believes in what is already known.

Another point, which is not as realistic in *The Martian* is the depiction of the dust storm that nearly led to Mark Watney's death and his abandonment on Mars. The planet's atmosphere is so thin that winds are generally mild, and while the dust itself can be harmful, it was not actually an issue for the original mission.

There are several other errors, such as when Mark was climbing a ladder and had problems with it, as there is only the atmosphere like one-third of the Earth one, is the story well excepted what the scientist and most of the things seems to be more or less possible.

What is impossible is the amount of money that would be needed to maintain his life and bring him back to Earth, which probably no government would agree to spend on just one life, with not even that many scientific inventions and news.

The project Hail Mary is more in the speculative genre and we cannot say clearly if it is possible or not, but the author writes it as if it is true and in a completely normal way. For example, the symbiosis of different species of humans and Eridians seems completely

normal and the reader does not feel the surreality of this action. This changes the audience's view of biology and other exact sciences for a while. Weir's ability to blend and bend reality is more visible in the book *Project Hail Mary* because of the more complex system that has to be implemented alongside our known natural laws. A great example is when Weir describes how Eridians eat and eliminate from their bodies:

The rocky armor on his abdomen splits and I see something fleshy rip open underneath. A few drops of shiny silver liquid dribbles out. Blood? Then a gray blob plops out of his body into the pan. It lands with a damp-sounding splat. He seals the pan and puts it back in the box it came from. He returns to the food and flips over onto his back. The gaping abdominal hole is still open. I can see inside. There's soft-looking flesh in there.¹²¹

In both *The Martian* and *Project Hail Mary*, Andy Weir employs cognitive estrangement to challenge readers' perception of reality and expand their understanding of human potential in extreme situations. Through speculative elements connected with scientific principles, both novels present unfamiliar and thought-provoking scenarios, in first the Mars exploration in second space exploration and alien life. *The Martian* force readers to think about the fragility of human life in space. *Project Hail Mary*, on the other hand, elevates cognitive estrangement by introducing more speculative elements, like faster-than-light travel and aliens' species and the limits of Earth technologies.

Both novels, despite their differences, encourage readers to think critically about technological progress, survival, and the unknowns of space exploration. Placing their protagonists in situations far removed from the familiar, Weir opens new possibilities for both science, human resilience and imagination.

3.7 Worldbuilding

How is the world build, enhances the concepts of novum and cognitive estrangement to the matter of coherence and neatly organized way of how to introduce the reader to the world. Especially for the sci-fi it is crucial not to haste things too much in order to give the reader a chance to establish things in the world.¹²²

The biggest difference between the two books is that the world in which Mark lives in *The Martian* has not yet been created, and he creates most of the facilities and space for

¹²¹ Weir, *Project Hail Mary*, PDF ebook.

¹²² Leah Zaidi, 'Worldbuilding in Science Fiction, Foresight and Design', *Journal of Futures Studies* 23, no. 4 (30 June 2019), [https://doi.org/10.6531/JFS.201906_23\(4\).0003](https://doi.org/10.6531/JFS.201906_23(4).0003).

living on his own. Before he withdraws the Pathfinder, he is not even able to communicate with Earth, something for which his mission was never prepared. He has to think about how to get the daily basics such as water, food, or energy, to maintain the solar panels. For a short time, he has every scientist in the world helping him, but after the Pathfinder's failure he has to survive on his own again, the same with the journey to the Schiaparelli crater where the MAV for Ares 4 is located. His little remarks on the situation of being the first person everywhere are quite common, such as: "I'm in the middle of a bunch of craters that form a triangle. I'm calling it the Watney Triangle because after what I've been through, stuff on Mars should be named after me."¹²³

The world of *The Martian* is built through real science, problem solving and vivid descriptions of Mars. We learn about Mars through Mark Watney's everyday life and the problems he has to solve, such as modifying his equipment, growing food and finding ways to survive in the harsh conditions. The planet is not just a background; it actively shapes the story by constantly creating new dangers. Beyond Mars, the novel also shows how NASA and other space agencies on Earth work together to bring Mark back to Earth.

Mark's daily logs are heavily descriptive, but they read more like a monologue, as he initially believes he is doomed and will never leave Mars. The rest of the world is mostly revealed through dialogues between his crewmates or a few people from NASA's command centre. The pacing of introducing new information is perfectly suited to the reader, and the novel effectively avoids overwhelming the audience by gradually introducing the world and providing detailed descriptions

What helps is a small map at the beginning of the novel showing where the places are and how far they are from each other

Project Hail Mary takes a different approach. The world is already fully established, but neither the main character nor the readers initially know what it looks like, or even where it is. The story follows two timelines. One is about Grace's present-day experiences aboard the ship *Hail Mary*, while the other reveals the project's origins, intentions, and construction, with Grace playing a key role. Both timelines gradually build toward a major reveal at the end. As at the beginning Grace does not know where he is:

¹²³ Weir, *The Martian*, PDF ebook.

...and shouldn't there be doctors? Or maybe the sounds of a hospital? And what's with this bed? It's not a rectangle, it's an oval and I think it's mounted to the wall instead of the floor. "Take..." I trail off. Still kind of tired. "Take the tubes out..."¹²⁴

Unlike *The Martian*, this book focuses on the possible new species and world created, which positions this story more to the speculative part. However, the way Weir achieves this is strictly scientific with the introduction of Rocky, an intelligent alien from another star system. Weir develops the Eridians with their own biology, technology and communication methods, all based on science. Nothing about their species is presented without explanation. If something seems unclear, Grace often notes that it's simply beyond his current understanding, which adds a sense of authenticity to the story. Weir even explains why certain technologies are unknown to the Eridians and why some remain a mystery to humans. This blend of real science and imagination makes the story both unique and exciting.

Another key difference is that in *Project Hail Mary*, the reader is given a blueprint of the ship at the very beginning, allowing them to understand more than the main character does for the first few chapters. In contrast, in *The Martian*, both the reader and Mark share the same level of uncertainty about the situation from the start. Similar thing is that in *The Martian* reader has a map as well, of the surface of Mars, in order not to get lost, when Mark travels on Mars.

One important aspect of worldbuilding in both *The Martian* and *Project Hail Mary* is how perspective is used in a limited way, to slowly create the world around the main characters. In *The Martian*, the reader learns about the environment mostly through Mark Watney's log entries, which are filled with his personal thoughts, scientific reasoning, and occasional humour. The world is built around his experience, and since he's completely alone, his narrow point of view feels natural. On the other hand, *Project Hail Mary* works with a dual timeline, where Grace wakes up without any memory of who he is or what his mission is. The reader learns about the world alongside him, piece by piece, as his memories return. This structure helps the reader connect to the mystery of the story, while also offering a more layered view of the world in contrast to the straightforward log format of *The Martian*.

Another strong part of Weir's worldbuilding in both books is how he uses science not only to explain the plot but also to create a believable structure for the world. While *The*

¹²⁴ Weir, *Project Hail Mary*, PDF ebook.

Martian focuses more on real existing technology, *Project Hail Mary* goes more into speculative science, as was already mentioned, like the astrophage or alien life. Still, everything is explained with logic and supported by Grace's problem-solving mindset. The way Weir introduces each concept makes even the most unfamiliar ideas, like alien biology or the astrophage's energy behaviour, feel convincing. Instead of simply stating how something works, the story shows how it is discovered, tested, and sometimes even misunderstood. This way, the scientific process itself becomes part of the worldbuilding.

Lastly, the tone of both books plays an important role in shaping how the reader experiences the world. In *The Martian*, the sarcastic and self-aware tone of Mark's logs adds humour to otherwise stressful or life-threatening situations, which helps balance the heavy scientific detail with a lighter narrative voice. This makes the harsh world of Mars more approachable and even relatable. In *Project Hail Mary*, the tone shifts slightly. The story still includes humour, especially in the dialogue between Grace and Rocky, but it also explores themes of loneliness, trust, and cooperation. The emotional bond between a human and an alien is unexpected but very effective in making the speculative elements feel human and meaningful. The emotional connection adds a deeper layer to the world, showing that even in the most distant and unfamiliar settings, relationships and empathy still matter.

3.8 Other Concepts

In this subchapter I will try to address minor concepts that are still important but does not dominate the sci-fi genre.

3.8.1 Environmental Perspective

This is a similar concept in both books, addressing environmental issues. In *The Martian*, Mark explicitly points out that people are polluting Mars, and when something breaks, it is simply left behind. "So, while it's really tempting that I'm within striking range of another rover (man, we really littered this planet with them, didn't we?)"¹²⁵

As in *The Martian* any book nobody looked on the environmental expenses of saving Mark from Mars. In *Project Hail Mary* was this problem addressed much more, for example when they were blowing out the Antarctica to let the methane into the atmosphere. "The gases from that decomposition, most notably methane, got trapped in the ice." "And methane's a pretty powerful greenhouse gas," I said. He nodded. "Far more powerful than

¹²⁵ Weir, *The Martian*, PDF ebook.

carbon dioxide.”¹²⁶ The crisis of global cooling caused by the astrophage, tiny organisms that consume solar energy, forces humanity into a desperate scientific race to save the planet. This fictional scenario of rapid climate change mirrors the real-world issue of global warming, but in reverse. While Weir imagines a sudden plunge in temperatures, today we face the steady and dangerous rise of global heat due to greenhouse gas emissions. The novel acts as a powerful warning: whether it's cooling or warming, drastic changes to Earth's climate can have catastrophic consequences. It emphasizes the importance of international cooperation, science-driven solutions, and the urgency of acting before it's too late, lessons that are directly relevant to the climate crisis we face now.

3.8.2 Language

Another significant aspect of the story is how Grace and Rocky learned each other's languages. They began with simple, observable concepts and gradually built up their vocabulary until they could communicate fluently without using a translator. The key for Grace was understanding the fundamentals of the Eridian language, especially how to replicate its tonal structure. From Rocky's perspective, the details of his language-learning process were not fully explained. It was only said that his species has an exceptional memory and can recall everything that's been said.

Where was the language problem visible was in the cultural things, just the knowledge of the speech has not helped them to understand some important things.

“Is private. I sleep after eat. You watch me sleep, question?” “I want to watch you eat!” “Why, question?” “Science,” I say. Rocky shifts his carapace left and right a few times. Eridian body language for mild annoyance. “Is biological. Is gross.”¹²⁷

Knowing the words was not always enough as they often misunderstood each other's social norms and culture. For example, what seemed like a harmless scientific observation to Grace was seen as invasive by Rocky, who found watching someone eat or sleep inappropriate. This highlights how true communication goes beyond vocabulary; it requires understanding the values and customs that shape meaning in different cultures.

¹²⁶ Weir, *Project Hail Mary*, PDF ebook.

¹²⁷ Weir, PDF ebook.

Mark has to learn only a Morse code to be able to communicate with Earth after the radio stopped working, still the knowledge of another “language” was handy for the whole Earth and necessary for the mission to rescue him.

CONCLUSION

Andy Weir's novels *The Martian* and *Project Hail Mary* have captivated readers by combining scientific accuracy with engaging storytelling. As this thesis has shown, these works are more than entertaining adventures. They reflect an evolution of the sci-fi genre, closely aligned with theories by Suvin and Roberts.

Both novels gained significant popularity and had considerable cultural impact, with *The Martian* adapted into a 2015 film starring Matt Damon¹²⁸, and a *Project Hail Mary* film slated for 2026 with Ryan Gosling¹²⁹ in the lead role. This highlights sci-fi's continued relevance when stories are innovative and thought-provoking.

To fully understand Weir's contribution, this thesis first examined the genre's history and theoretical foundations. While the background overview was necessarily brief, it helped define key sci-fi elements like novum, cognitive estrangement, and worldbuilding, all of which are necessary to analyse Weir's works as well as any other contemporary sci-fi story.

Weir builds on the legacy of authors like Shelley, Wells, and Asimov, pushing modern hard sci-fi forward. His writing shows scientific knowledge and logical thinking demonstrated by his main characters through their actions, whether through Watney's problem-solving on Mars or Grace's collaboration with an alien species. Both protagonists embody adaptability, intelligence, ability to work in a team, demonstrating that Weir's stories are more than ordinary hard sci-fi.

One slight drawback is that both novels share a very similar tone and structure, at times, it can feel as though Mark Watney is simply embarking on a new adventure under a different name, rather than the story offering a wholly distinct experience. However, this does not diminish the value of either book. Instead, it highlights Weir's consistent narrative style and the autobiographical elements he often incorporates into his protagonists. This similarity may also help explain why *Artemis*, which features a female lead and a notably different tone, did not achieve the same level of success as *The Martian* and *Project Hail Mary*.

An analysis of Andy Weir's novels reveals how skilfully he constructs his fictional worlds, capturing the reader's attention with a sense of thrill and excitement. He achieves this by carefully limiting the information provided to the reader, mirroring the main

¹²⁸ *The Martian*, Adventure, Drama, Sci-Fi (Twentieth Century Fox, TSG Entertainment, Scott Free Productions, 2015).

¹²⁹ *Project Hail Mary*, Sci-Fi (Amazon MGM Studios, General Admission, Lord Miller, 2026).

characters' reasoning. The audience learns only what the protagonist knows, which heightens the tension and immerses the reader deeply in the action.

The novum differs in complexity between *The Martian* and *Project Hail Mary*. In *The Martian*, the novum lies in the possible near-future scenario of travelling and surviving on Mars, something that could become reality within a few decades. In contrast, *Project Hail Mary* presents a more complex situation involving environmental catastrophe and the gradual dying out of the Sun. This crisis forces humanity into interstellar travel to the Tau Ceti system, where the main character encounters alien life forms and deals with another organism from different planet, all presented through a lens of real scientific principles.

Weir avoids the use of unexplained magic. Instead, he fully embraces the conventions of hard science fiction, seamlessly incorporating new concepts grounded in real science. As a result, the plots of his novels are firmly rooted in logic and scientific reasoning, even when set in distant, imaginative futures.

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