# Individual and Collaborative Labour in the Space Crisis Movie: From Apollo 13 to The Martian

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Like so many space crisis dramas, both fictive and historical, articles attending to the scientific credentials of *The Martian* (Dir. Ridley Scott, 2015) prefigured its release, and the publicity they generated informed attendees' experiences of the film.[1,2] It is always interesting to note when science fiction films are heralded with a publicity narrative of technical "accuracy," yet it is even more intriguing to scrutinize the values floated alongside notions of accuracy; there is a more forceful and subtextual narrative running throughout *The Martian*, and it concerns the ownership of science innovation. This article compares the depiction of scientific labour across space crisis movies, and critically evaluates the way such films attribute intellectual innovations either to individuals or to teams, in particular focusing on readings of *The Martian* and *Apollo 13*. Drawing from materials in the John Sayles Archive at The University of Michigan I take a close look at John Sayles's uncredited screenwriting work on *Apollo 13*, including correspondence with Ron Howard that emphasizes the importance of representing collaboration cinematically.[3] Readings of secondary films, including *Space Cowboys* (Dir. Clint Eastwood, 2000) and *Hidden Figures* (Dir. Theodore Melfi, 2016), also help isolate some of the gender and racial politics of these texts – and space fantasies at large. I then broaden the scope of these studies to examine Hollywood's interest in selling films as the work of auteurs and prodigal artists, ultimately asking why film scholarship has had trouble intervening against these sole authorship narratives. I make the case that the cinematic representation of intellectual labour, conducted into vivid dramatic scenarios across space crisis films, is a place where we feel our collective future at stake, and so these films are apt for investigating common fantasies of human advancement.

American individualism has a long, and at times contradictory, theoretical history.[4] In this paper, individualism does not refer to a moral philosophy accentuating the autonomous individual's responsibility, agency, and centrality to meaning (notions of a truer, stable selfhood beneath our social influences); rather, I refer to a political sensibility that holds the unilateral labour of the individual as superior to the coordinated output of groups.[5] Following Herbert

Hoover's exceptionalist discourse in *American Individualism*, the term has tended to be associated with his "rugged individualism," or what we might now call *laissez-faire* capitalism.[6] In Hoover's publication, the president to-be suggested that it is precisely those hands-off affordances the nation makes to the individual and their liberties that elevate the United States, making it exceptional.[7] But the reasonable political imperative to protect the individual's liberties can quickly become a presumption of merit in merely exerting those liberties. So, for example, one might consider that there is merit in arms ownership simply because it exercises an individual right, not because of the outcome of keeping firearms. The production of this merit is key to understanding American individualism: that when the individual acts voluntarily – and without governmental interference or support – merit is invariably produced, no matter the exploit, as the individual has exercised sacred rights.[8]

In coordinated action, then, the individual's distinction can conversely be threatened. At this point American exceptionalist individualism becomes a personality politics, or what Robin M. Williams Jr. describes as the primacy of "*individual personality* rather than group identity and responsibility."[9] These ideals undergird how one might evaluate the accomplishment of intellectual labour, in individuals and in groups. It is this personality politics that I take an interest in, and that Williams explains not so much as a theory, but a cultural attitude (expressed through some popular media, as we will see). Likewise, the purpose of this paper is not to offer a treatise on the politics of individualism; it is to analyze how emergences of these individualistic ideals, as well as resistances against them, recur across a number of key space crisis texts, and to uncover how related theories such as auteurism assume a similar ideology.

Space crisis describes those pictures whose primary drama concerns the resolution of life-threatening emergencies in extraterrestrial environments. Some are historical, like *Apollo 13* or *The Right Stuff* (Dir. Philip Kaufman, 1983), where others work from some degree of speculative science fiction in near future settings, such as *The Martian* or *Gravity* (Dir. Alfonso Cuarón, 2013). *The Right Stuff* can be viewed as an influential landmark in Hollywood's mythologizing of American space programs, setting the stage for subsequent space crisis works such as *Apollo 13* and *Space Cowboys*. *The Right Stuff* echoed a sensibility of American manifest destiny, fronted by heroic white male leads, inherited from models of postwar science fiction filmmaking.[10] In turn, these early space crisis films influenced later science fictions that would combine elements of both the space crisis and space fantasy genres: *Mission to Mars* (Dir. Brian De Palma, 2000), for example, largely depicts a Mars rescue mission and trouble-shooting predicaments in interplanetary travel, however its key plot points also involve aliens.[11] Others still, such as *Hidden Figures*, are focused exclusively on the challenges of space travel within agencies on the ground, rather than on board a ship, and attempt to modify the identities associated with space race mythology. These

pictures are sometimes called "space disaster dramas," however the term brings to mind apocalyptic settings such as 1998's *Armageddon* (Dir. Michael Bay) and *Deep Impact* (Dir. Mimi Leder), where the space crisis films tend to depict events threatening the lives of a few protagonists in space, an emergency or problem-solving a particular dilemma (such as *The Right Stuff* or *Hidden Figures*) rather than cataclysm. Disaster also connotes the *results* of a crisis including loss of life, which is often averted in these films, and "space disaster" is a broader designation that tends to include more elements of space fantasy, such as alien attack films.

Entries in the space crisis canon have proliferated in the 2010s, with *The Martian*, *Gravity*, *Hidden Figures* and *Approaching the Unknown* (Dir. Mark Elijah Rosenberg, 2016) all released in the span of three years; as such, now is a good time to investigate some of the fantasies of futurity these films both challenge and sustain. Readings of *The Martian* and *Hidden Figures*, as well as a detailed look at the production background of *Apollo 13*, will survey a spectrum of approaches to individualism within the space crisis canon, as well as film industry and film scholarship, allowing some vantage on a trajectory of changing ideologies embedded in these texts, their production and their criticism.

## The Maverick Genius as Science Advocacy in *The Martian*

Space travel is often presented as a proxy for general human achievement and betterment, sometimes as a proxy for American exceptionalism, and sometimes simply the work of a heroic individual.[12] Yet these pictures all to varying degrees "celebrate the joy, fear, and idealism of space exploration", operating as science advocacy films in their oft-exultant portrayal of science workers very directly saving lives.[13] For example, in a review of *The Martian* for the journal *Science* (which devoted multiple articles and interviews to the film), Meghna Sachdev wrote, "The romantic lead isn't Mark Watney (Matt Damon), the intrepid astronaut hero who gets stranded on Mars after a NASA mission goes awry. It's science."[14] *The Martian* effectively brands itself as generalist science advocacy during a pivotal scene in which Mark, the marooned botanist who uses fecal matter to grow potatoes on Mars, rallies his survival instincts with a pun delivered direct to camera: "In the face of overwhelming odds I'm left with only one option: I'm going to have to science the shit out of this." Indeed, the best part of the 2015 adaptation of Andy Weir's novel is its continuing open invitation for the audience to ask, *could this actually work*?[15] The film produces a satisfying kind of metacognition: at some points *The Martian* prompts incredulity toward the interplanetary solutions it presents, allowing opportunities for the interrogation of one's own response; in turn, this incites a tandem, reflexive questioning of the bounds of our collective astronomical capabilities, and what the spectator is willing to accept as realistic and achievable.

On the other hand, a number of subtle narrative devices in *The Martian* attribute key breakthroughs to the work of the lone genius rather than effective collaboration between members of a team of experts. These include a tendency to rely on sarcastic and otherwise obstructive dialogue between teammates on the ground to produce drama, narrative events that attribute trouble-shooting invention to solitary workers, and a dependency on the cinematic representation of triumphant individual action. In short, *The Martian* tends to celebrate individual accomplishment over collective achievement, and ascribes scientific breakthroughs to the work of the individual rather than a process of many people working together.[16]

The maverick genius – an individual who is always right when the collective is wrong – is a Hollywood staple, especially in stories concerning scientific advancement. Consider the filmic treatment of other technical innovations, from mathematics and codebreaking in *The Imitation Game* (Dir. Morten Tyldum, 2014) to more recent social media inventions in *The Social Network* (Dir. David Fincher, 2010). In the opening reels of *The Imitation Game*, Alan Turing (Benedict Cumberbatch) is presented as "a humorless, asexual loner whose superhuman mental powers are compromised only by an almost autistic indifference to social norms", and an arrogant savant (self-proclaiming himself "the best mathematician in the world") whose greatest ideas are developed in solitude.[17] On arrival at Bletchley Park, he announces, "I don't have time to explain myself as I go along, and I'm afraid these men would only slow me down," and the narrative corroborates his arrogance as reasonable when he repeatedly proves his colleagues (the obstructive collective) wrong. With this depiction, writes Christian Caryl, "Tyldum and [screenwriter Graham Moore] are determined to suggest maximum dramatic tension between their tragic outsider and a blinkered society" to which his fellow codebreakers belong.[18] This falsification has incensed those who knew Turing: he was not necessarily autistic, he was sociable and generous, and although he liked working alone, he attributed much of the innovation he is known for to coworkers.[19] The prevalent autism-savant trope effectively suggests that all geniuses can be identified as such from clear external social characteristics.

There is, of course, nothing wrong with allowing people the space to innovate on their own. Recognizing this need is part of any good organizational structure, and central to averting groupthink.[20] Yet innovation and learning are still supported by effective teamwork, and those who are most confident of their views are not necessarily any more productive, innovative or correct, as the lone genius trope suggests.[21] Some space crisis films make mention of teamwork but then manufacture reasons that their protagonist has to "go it alone." Clint Eastwood's character, Frank Corvin, in his 2000 film *Space Cowboys*, is a good example. Throughout the narrative, Frank is continually told that he is not a team player. Frank is vindicated in his inflated self-belief as the narrative confirms his expertise at every climactic opportunity, an expertise that would have been foiled had he listened to and worked closely

with his peers. These qualities are linked to his maleness, and the film is also an unabashed male fantasy: the vast majority of *Space Cowboys* is not taken up with scientific problem solving as much as it is sexual harassment in the NASA workplace before anyone is even shot up into space. The ostensibly lovable old white men lecherously approach the female protagonists they brand "lady doctors" with a risible rate of genuine success.[22] More so than anything about space crises, this film proposes that men will be rewarded for sexual harassment in the workplace because female workers are secretly longing for flattery; women's labour is ultimately no match for the "blend of impetuousness and mastery of body and machine" that defines the true male archetype, and to which the film acts as part paean, part eulogy.[23]

*Space Cowboys*, then, begins to expose some of the key gender politics within this cluster of films, and within space narratives at large: first, we might note that the savant figure, mechanical wunderkind or maverick is almost always a man.[24] Many have pointed out, too, that space exploration narratives more broadly, fictional and otherwise, with their thrusting rocketships and expansionist conquests, have been dominated by the terms of male fantasy, a conceit with observable and documented consequences.[25] Moreover, *Space Cowboys* underscores some persistent, essentialist concepts of male and female aptitude: many of these films tend to propagate the notion that women, being more socially accommodating, are natural collaborators, while the authentic and heroic work of innovation and breakthrough is best suited to the less socially distracted male.[26] These tendencies may in part be derived from *The Right Stuff*'s self-conscious quotation of Western character conventions, an influence framing even the title *Space Cowboys*, and extending to *The Martian*'s science labourer cum frontiersman Mark Watney. A distinction between two male character types is also observable, or a binary view of scientists' personality traits: the oddball intellectual as ultimate outsider (as in *The Imitation Game*), and the science labourer as boys club insider. As such, maleness is a theme that recurs throughout this paper. The autism-savant typification, seen in these broader terms, is worrying because of its suggestion that an epitome of maleness is reached in maximum sequestration of one's labour; fantastical visions of the ideal man recur across science fiction and science advocacy narratives, and isolated or otherwise self-reliant individualism is one of the ideal's key characteristics. Films like *Space Cowboys* not only enshrine the heroic, risk-taking individual (who needn't be antisocial, but is always self-reliant); they insinuate that these qualities make male labour intrinsically superior.

*The Martian* stands out as a more intriguing example. Its references to the sole innovator are more subtextual, embedded within a narrative that still stresses the value of scientific progress during a large-scale rescue mission. One of the places we can look to is the relative dysfunction of large teams, the NASA apparatus and its contractors, as pitted against the situated, solitary, and productive work of the astronaut in space. NASA staff members are, surprisingly enough, presented as unbelievers who bicker, hurl sarcastic

insults at one another, and seemingly fail to produce much in the way of meaningful or innovative crisis management work. Weir's novel mentions Mark's sarcasm (clearly a coping mechanism) more than once, but the film instead features aggressive use of sarcasm between NASA staffers to shut down the ideas of others.[27] When presented with difficult objectives, for example, NASA staffers complain and push back, telling their commissioners the work cannot be done. The first time this happens is when NASA Director Teddy Sanders (Jeff Daniels) instructs the Director of the Jet Propulsion Laboratory (JPL) Bruce Ng (Benedict Wong) to halve the time it takes to send a pre-supply mission to Mars. He protests; a coworker is seen clearly in the foreground holding up a sign on which he has written the word "NO," summarizing the sentiment of colleagues shaking their heads in the background of their reaction shot. The scene closes with Sanders chiding Ng: "Mark dies if you don't," a punchline which effectively signals that the JPL team's pushback is a filmic method to concoct drama, the payoff being a reminder of the life that is at stake. The screenplay, credited to Drew Goddard (who also serves as executive producer), is punctuated by similar protestations, shutdowns, sarcasm and caustic remarks between staffers, presumably to craft a sense of conflict. For instance, when NASA miraculously makes its first contact with Mark, JPL staffer Tim Grimes (Nick Mohammed) makes an obstructively sarcastic remark: "Thirty-two minute round trip communications time, all he can do is ask yes/no questions, and all we can do is point the camera. This won't exactly be an Algonquin Round Table of snappy repartee." Even when Ng's team does begin to innovate later in the picture, another part of the NASA apparatus invariably rejects their ideas before coming to accept their labour. One of the most striking innovations in the film is the notion of launching an astronaut into space with mere plastic at the front of their ship in order to reduce the vessel's weight. "You want to send him into space under a tarp?" asks the Director of Mars Missions Vincent Kapoor (Chiwetel Ejiofor). Ng says, "Yes, can I go on?" to which Kapoor shuts him down: "No," and the scene ends. This kind of immediate seizure of fruitful ideas appears commonplace in the NASA working environment.

When the rescue mission's workers on the ground do come up with a creative solution, it is often strangely positioned as attributable to a single individual working alone, distant from NASA's collaborative workspace. For example, the astrodynamicist Rich Purnell (Donald Glover), whose gravity assist trajectory permits Ares III Commander Melissa Lewis (Jessica Chastain) to return in their ship, the Hermes, and rendezvous with Mark above Mars, works from home. When Rich is introduced, his excitable figure is framed by the classic trope of a blackboard full of equations. It is evident that this is Rich's own work, allowed to come to fruition due to his isolation; again, the work of a solitary genius whose results have not been impinged upon by a dysfunctional system. When a visiting member of the JPL quizzes Rich on his plans, the astrodynamicist is too engrossed in his solitary intellectual labour to respond; knowing it is best to leave him to his own devices, the JPL representative

reminds Rich that he is "the boss," and shuts the door quietly behind him. When NASA needs a new plan to get Hermes to Mars, their whole team is unable to come up with a timely solution. It is Rich, working alone, who devises the rescue plan that ultimately goes ahead. This is perhaps the most overt example of the film's parallel narrative of individual genius undermining collective labour, as Jeffrey Kluger explains:

A slingshot maneuver—or gravity assist—was what guaranteed the first few Apollo lunar crews a free ride home if their engine failed as they were approaching the moon, and it has regularly been used in interplanetary explorations … In *The Martian*, however, the use of a gravity assist is portrayed as a late-night brainstorm by a NASA technician, one that requires him to run his equations on a room-sized super-computer and then explain the wondrous idea to a skeptical Administrator of NASA. But a NASA Administrator who didn't know what a gravity assist was would be like a cardiac surgeon who couldn't find a heart inside a patient's chest.[28] This conceit makes it clear that the screenplay bent its own rules to accommodate a lone genius narrative; the drama of heroism proves a stronger imperative than the script's vaunted scientific accuracy.

In addition to this, Matt Damon's character Mark Watney is seen consistently at odds with his NASA colleagues on the ground. Instead, NASA's collaborative structure is (with a few exceptions) presented as the obstacle to Mark's profound genius.[29] Mark acknowledges this as soon as contact is reestablished between his station on Mars and NASA, as he quips: "They've got a roomful of people trying to micromanage my crops, which is awesome. Look, I don't mean to sound arrogant or anything, but I am the greatest botanist on this planet…" During the climax, Mark explains his mission to intercept with Hermes thusly: "Luckily I have the greatest minds on planet Earth; really *all* of the brainpower on the entire planet helping me with this endeavor, and so far they've come up with, 'Hey, why don't you drill holes in the roof of your rover and hit it as hard as you can with a rock.'" In fact, Mark is reported to consistently tell others working on his problems to, in Vincent's words, "have sex with themselves." In part this is presented as lighthearted jocularity, yet it so often seems to come at the expense of large-scale teamwork, and in service of the heroic individual. Mark is vindicated multiple times when his own plans save the day; the NASA apparatus is always one step behind the story's hero.[30] As Khara Lukancic puts it, "In *The Martian*, Mark Watney, a botanist, consistently solves every problem that arises to eventually save himself by rejoining his crew as they have failed in all their attempts to save him from being stranded in the remote and hostile planet."[31]

During the climax, Mark must be seen to come up with the idea that ultimately completes the rescue mission: puncturing a spacesuit to propel himself to the Hermes. Commander Lewis does also come up with the idea of creating an explosive to reduce their ship's speed, aiding the rescue. In order to achieve all this, however, Melissa cuts communications with Earth, anticipating that

mission control will intervene and object to the planned course of action, which ultimately saves Mark's life. The final mission dramatically boils down to the work of these two in order to intercept after severing their contact with earth. The contrivance of limiting NASA interference (rather than, more likely, their devoted assistance) is also emblematic of the film's general hostility toward the norm of remotely controlling sensitive operations in space – most operations can be controlled more safely from an indoor console – as this would remove agency from the situated hero.[32] These particular sequences, in which the hero suspends communications with earth to avert mission control's objections to courageously risky technical work, or otherwise overrides remote operations, have become a convention recurring multiple times in recent films such as *Approaching the Unknown*. Following the climactic rescue, *The Martian* closes with Mark's final speech to his students, emphasizing the work of the individual as Damon crafts a hypnotic rhythm from the word "you":

At some point, everything's going to go south on you, *everything*'s going to go south and you're going to say, 'this is it, this is how I end.' Now you can either accept that, or you can get to work. That's all it is. You just begin. You do the math, you solve one problem, then you solve the next one, and then the next. And if you solve enough problems, you get to come home.
*The Martian* is a powerful piece of science advocacy but some questions remain regarding its presentation of the work of science, which strongly suggests its best outcomes are produced in isolation.

I want to emphasize that these problems are for the most part subtextual and inherited from the conventions of heroic narrative scripts. The film does not completely omit collaborative effort: for example, NASA does send Mark instructions to hack the rover in order to link it to Pathfinder's broadcasting frequency, opening up a superior channel of communication. The cooperation between Chinese and American space agencies is represented as a positive transnational collaboration even though, in a central, nonverbal montage sequence, interaction between the workers of either nation is represented as futile due to their language barriers (when Mitch fails to communicate with a Chinese colleague, Chinese cooperation is reduced to the donation of resources rather than intelligence). There is a clear confusion regarding how to understand the nature of individual and collaborative labour running through the film, and at best one could think of *The Martian* as an attempt to talk through these problems.[33] *The Martian* is also a sumptuous spectacle film, and this spectacle can be attributed to the commitment of innumerable filmmakers working together to produce a sense of immensity, awe and enthrallment with just a cinema screen and a speaker system. We might also keep in mind that *Alien*, the 1979 space adventure that made Ridley Scott's name, was successful precisely because of its collaboration between Scott, the writers and producers, and their trust in the creative work of all manner of artists and designers; not just the decision to entrust painter H.R. Giger with key filmic design features, but the art department, creature designers and puppeteers who made the designs come so convincingly to life, or the production

designers and set decorators who were all entrusted with crafting key features of the film's aesthetic, the mysteries of which still resonate with audiences today.[34]

In a way, our activities in space present something of a testing ground for human organizational systems: a completely foreign environment that delivers new and surprising challenges, requiring us to adapt quickly. So the fantasies we project onto interplanetary adventures speak as much to the possibilities of science as they do more generally to the potentialities of human organization and labour. The film industry moves through phases of greater liberalism in its depictions of working life, and having looked at some recent examples of heroic individualist models of intellectual labour, I now turn to an example of effective cinematic collaboration behind the camera, and its translation to screen. In comparing collaborative processes in film content and film production, the following attempts to lay some groundwork for a new way of reading collaboration in cinema studies, and goes on to suggest how our scholarship might intercede rather than promulgate narratives of heroic individualist labour.

## John Sayles on *Apollo 13*

One of the unexpected stories revealed in the John Sayles Archive concerns the extent of the screenwriter's uncredited involvement with *Apollo 13*, a film that demonstrates how constructive teamwork can be represented cinematically. Imagine/Universal brought Sayles on board as a script doctor to provide, in the words of associate producer Michael T. Bostick, "a production rewrite that will primarily enhance characters and dialogue."[35] He ended up delivering much more than might ordinarily be expected of a script doctor, however, including four drafts, extensive research and revisions, coverage suggestions and a synthesis of ideas collated from the director, actors, astronauts and other research subjects. In surveying some of his commissioned scripting, Sayles scholar Jack Ryan calls *Apollo 13* the filmmaker's "best-known uncredited work"; indeed, his work on the film and subsequent appeal for authorship recognition have become somewhat folkloric in the history of screenwriting.[36] The archive reveals the scope of this work, covering characterization but also a refinement of the script's technical details as he liaised with astronauts Jim Lovell, Dave Scott, and former mission control staff to weave their knowledge and experiences into the story arc, using narratively satisfying, non-expository means.[37] Sayles made himself familiar with the workings of the spacecraft, taking notes on the Apollo Command Module Manual, mission reports and mission commentary, along with media reports, collected archival footage from CBS and ABC, and the astronauts' personal recollections.[38] Working with research supervisor Julie Donatt (who would also play a reporter in the film), Sayles evidently took the fact-checking very seriously, drawing up a timeline of the real events of the crisis alongside those of the screenplay in order to produce drafts with

emotional appeal that did not elide scientific or historical detail.[39] Jim Lovell also read Sayles's first redraft and made notes that Sayles later integrated along with technical contributions from former director of NASA's Lyndon B. Johnson Space Center Gerry Griffin, former flight controller Jerry Bostick, and Jeff Kluger, Lovell's coauthor on *Lost Moon*, the book from which the film was adapted.[40–42] Sayles's initial four drafts changed the film considerably, not only providing alternative dialogue and new characters but major shifts in structure and pace, too. He later worked alongside Howard and the actors during rehearsal, incorporating elements from improvizations and read-throughs into his final draft. In interviews, Sayles has credited Tom Hanks with a wealth of historical knowledge that made its way into the script, and Sayles notes, "a lot of that job was to bring the science back in, to challenge the audience a little bit."[43] The script, as Jamie Forbes puts it, "was beaten into shape by Sayles and Hanks."[44] That is, not only did Sayles provide much of the research, drafting and redrafting for *Apollo 13*, but the actors, the director, astronauts and mission control all had a hand in the content of the final shooting script. The screenplay was a collectively constructed document.

On one revision, Sayles noted to Howard some potential methods for cinematically representing teamwork:

Ed Harris is so strong that it can seem like he steps in and whips a bunch of silly academics into shape in Rm. 210, where it should be clear that this is how these guys always work, banging ideas off each other, arguing their positions, and that Kranz is only the referee in a match between brilliant rocket scientists. So the stronger you can make the controllers, foreground them in the shots or whatever, the more the sense of a larger "team" the story will have.[3]

This is indeed what we see in the final picture. The camera will often pull back to a wide shot revealing the many people working on the same problem, or sweep across mission control to communicate a sense of their coordination. A few tracking shots focused on the movement of a particular individual make a point of observing the furtive argumentation of other staff members in passing. Even though there are primary protagonists, the film consistently introduces new characters, each adding a key to the puzzle. The script promotes the free exchange of ideas: it never credits any one person with all of the breakthroughs. We hear conversation between multiple adept staffers, mutual encouragement, and often the suppression of egos to minimize hierarchies that may prevent democratic ideas exchange. That is, the film demonstrates how humility is a part of effective collaborative processes, and maintains an open question regarding how argumentative and at times antagonistic working dispositions can come to be highly functional.[45] These contributions are acknowledged in a letter from Howard, who writes to Sayles: "Thank you for a couple of very productive days. I'm very enthusiastic about the new scenes, character detailing and story re-structuring that was discussed… and best of all, I don't have to implement one word of it. Thanks again for your great ideas, patience and effort. Ron".[46]

Yet Sayles, a savvy independent in the American film industry who pioneered a number of production techniques to minimize the creative interference of studios and investors, was more philosophical than this.[47] In the same note to Howard, he writes:

Without writing anything more to underline it, I think it would be good to stay aware of a basic tension in this project, which is the communal nature of what really went down versus the more individual and "heroic" story we've made of it. Just casting stars automatically tilts it toward hero mode, but some of the decisions made in the last few weeks (like having Lovell be the one to figure out the blind burn) push it further in that direction. At the very beginning I remember Hanks saying this was the story of "our finest moment" and because we're working in the popular movie world there's always the tendency to make it be about Jim Lovell's finest moment. The space program itself had this tension, with the astronauts getting most of the limelight (and having to do most of the boring publicity) though they were really only one voice in the room. Somehow, powerhouse guys like Chris Craft and Gene Kranz and the high NASA scientists were able to bend their own dominating personalities to what had to be a free exchange of ideas where clarity of thought outweighed strength of presentation – the opposite of calcified bureaucratic or military chains of command.[3]

Again, it is in the representation of these tensions as part of constructive collaborative teamwork, and the work of innovation in a crisis, that the film shines; Sayles is at least partially responsible for this.[48] At its core is a suggestion about how respectful and egalitarian human organization is able to overcome seemingly insurmountable dilemmas. Howard understood that, in his words, "the Apollo 13 crew was not saved by 50 or 60 people in mission control. Ken Mattingly told me that he felt that at one point there had been as many as 5000 individuals working in private industry, research, some of the companies that had developed and produced components, all working on the crisis."[49] Not only this, *Apollo 13* tells a story about the complexity and difficulty of overcoming hierarchical norms in the workplace, fueled as they are by tradition, expectation and ego, and the personal rewards that may ensue on challenging these norms. The contrast with *The Martian*'s images of NASA floundering and the star astronaut's heroism is stark.

It is ironic, however, that in a film emphasizing teamwork like *Apollo 13*, itself a triumph of collaborative cinematic storytelling, industry bodies moved to excise Sayles's intellectual labour from the credits.[50] One could reasonably conclude that accurate multiple authorship attributions may not have suited the studio's or the producers' publicity interests, however it may also be the case that the Writers Guild of America, through which Sayles applied for a credit, simply lacked a procedure for recognizing these shifts in production, such as a script doctor's transition to lead collaborator; and indeed the *Apollo 13* case was a famously contentious decision within the guild.[51] Yet it is clear that in selling a film about collaboration in science, industry bodies resorted to a default individualist narrative of arts and intellectual creative practice. The story is

doubly ironic as Sayles is one of a few independent American writer/directors who insist on depicting the working life of their subjects, and he does so with an eye to the human detail of collaborative labour:

In contrast to mainstream political thrillers that vacillate between the vision of the lone hero saving the day for all the lesser humans and the vision that social ills are caused by forces so evil, so pervasive, and so mysterious that society cannot be changed for the better, Sayles's films serve as a series of picaresque vignettes of people whose cooperation makes a small, sometimes inadvertent, but still potentially positive impact on their environment. Sayles's depiction of the mutual assistance that emerges out of conflicts between characters in films like *Matewan* and *Sunshine State* gives expression to the effect ostensibly private interactions can have on larger social-political circumstances.[52]

As Jancovich and Lyons explain, Sayles "is distinguished from the preciousness associated with art and the art film, but also from the terms of the 'auteur theory' … Sayles' films work to problematize notions of authorial autonomy, operating according to a kind of identity politics which acknowledges the complex and contradictory nature of social and political investments," and he refers to "our" film rather than "my" film in interviews.[53,54] In a cruel twist of fate, after introducing a more collective sense of crisis management into the *Apollo 13* screenplay in collaboration with the director, cast, and their real-life counterparts, Sayles never received a co-screenwriting credit. This misattribution is another example of Hollywood's projection of heroic labour as performed by a creative elite.

## The Future

The science advocacy film and its obverse, dystopian and near future horrors such as the television series *Black Mirror*, are just some of the settings in which we discuss our visions of the future: what it could look like, and what sort of current technologies and trends should lead us there. Science fiction in particular is where we go to chart the way human needs change along with the environments we create and then adapt to.[55] Individual and collective labour is part of this debate. At worst, we can say that some of the media fantasies studied in this paper contribute to widespread notions of the need for a heroic savior figure, perhaps giving rise to demagogues like Donald Trump.[56] And *Apollo 13* indeed permits space for its proceedings to be symbolic of the work of men, or of America at large.[57] Yet at the same time, the film finds its primary drama in the forfeit of grand, mythic statuses and ambitions, tempering the expectations of both the individual and the group. The filmmakers may be refiguring a costly NASA failure into a story of "NASA's finest hour"[58] and "the most amazing rescue operation of all time", yet throughout they maintain a dramatic focus on disappointments, what is lost, and what must be recalibrated.[59] Failure produces the drama: *Apollo 13* is

about how traumatic events force us to re-narrativise our histories, personally as well as nationally. In adapting a new causal narrative of success from the goals of physical human survival and wellbeing rather than cerebral conquest, we must relinquish ideals (a perfect moon landing) and mythic statuses (a perfect American, a perfect man). As Paul Marcus writes, "For all its associations with technology and scientific awareness, space travel ultimately symbolizes perhaps the most human – and irrational – side of us. *Apollo 13* specifically tries to isolate that part of the human psyche that emerges when reality says No".[60] Adaptability and perfectionism within group situations are, in fact, the twin key interests in Howard's other films of the era, as explored by Joseph Kupfer in his reading of 1989's *Parenthood*.[61] These films cover the psychological adaptability asked of us when things that should be perfect go wrong, from sensitive technologies in space to family relations in the home. *Apollo 13* is about perfectionist myths breaking down in order to be rebuilt from a place of extreme disappointment:

The sheer magnitude of the rocket, punctuated by a sci-fi style musical score, and the intricate setup in NASA's control room, add to the amazing sense that everything works. And then, almost systematically, that sense begins to erode, just as the spacecraft does … After they "lose the moon," as Lovell puts it, the disappointments come piece by piece, breakdown by breakdown.[62] Gathering tension in contrasts, editors Daniel P. Hanley and Mike Hill cut between the situated drama in space, collaboration on the ground, family and friends whose loves ones are imperiled, and the media – fallible, like all machinery in the film, flickering, distorting and ready to extinguish – that connects them.

So sometimes both the science advocacy film and science fiction can be about recalibration and reparation, too, averting utopian plans and aiming for nearer and more human goals. As Ricardo A. Wilson II points out in his reading of *Gravity*, the utopian register of these science fiction stories can be used to represent a more indeterminate futurity, and one that expresses tragic consequences and mistakes without abandoning the hope in our collective prospects.[63] The utopian mode can also emphasize the importance of working together. In science fiction, for example, the films and television series of *Star Trek* present as a series of parables of collaborative labour. *Star Trek*'s vision of utopian organizational politics is a terror management fantasy in that each crew's collective work always overcomes existentially threatening spatial and temporal anomalies, making the twin horrors of species and individual continuity benign.[64] It is also a fantastical reimagining of colonial history, if its key explorers were noninterventionist (as in the prime directive) and benevolent (enshrining racial equality as a core principle of governance).[65] Like *Apollo 13*, most of the *Star Trek* series present organizational structures that recognize and prompt individual creativity, emphasizing that inspiration in the workplace is best achieved when it receives support in coordination with the expertise of teammates: creative solutions to all manner of problems from the political to the cosmic are both

encouraged and eventually realized by proximate others.[66] *Star Trek* offers alternative fantasies to the perhaps more common fiction of the individual's conquest against irredeemably corrupt systems.

Unlike later *Star Trek* series that attempt to circumvent the white masculine manifest destiny of progenitor texts, *Apollo 13* still primarily represents the triumphant labour of older white men. While its primary protagonists are based on real figures, the filmmakers did miss opportunities to represent the labour of NASA's women and nonwhite staff, at the very least visually in its collaborative scenes.[67] Tom D. Crouch explains how debates in the popular media regarding this oversight were unfortunately seized upon and immediately shut down.[68] Even if there were no women or black workers on the floor in mission control during the crisis, their documented contribution could at the very least be represented symbolically, just as the coordinated exchange of ideas is summarized in a few shots or lines of dialogue. *Hidden Figures* intervenes against some of these earlier images of the NASA workforce, and demonstrates how the retelling of historical space race narratives can project ideals of desegregation and progress that speak more to our future than our past.

*Hidden Figures* is ostensibly a movie about collaboration, too. Its fundamental message is that superordinate goals will force us to overcome prejudices in the workplace, which produces better results both for the organization and the dignity of marginalized workers. In this case, the movie presents its argument on two levels, the organizational and the personal, and it is interesting to note how the movie draws an equivalence between gains for NASA and gains in the dignity of women and black workers. At the organizational level, removing obstacles targeting the ostracized worker, such as the "coloured ladies" restroom (the subplot of Katherine Johnson, played by Taraji P. Henson), leads to better results for the organization and its commissioning nation, as NASA increases its access to the expertise of women who go on to solve crucial problems.[69] At the personal level, management staff (represented by Kirsten Dunst in an antagonistic supervisor role) are forced to accept the career progression of black colleagues, and the benefits of equal rights are personally felt as well as expedient for the employer (the subplot of Dorothy Vaughan, played by Octavia Spencer; the film's third subplot of Mary Jackson, played by Janelle Monáe, is predominantly domestic in focus). This is all largely true: superordinate goals can in fact reduce prejudice and conflict.[70] However, in order to make its case regarding the benefit these workers brought to the space program, *Hidden Figures* resorts to presenting their work as palatably individualistic. This assumption may be somewhat reasonable: in order to confront the impediments of bigotry and workplace isolation, the film suggests, labourers like Johnson, Vaughan and Jackson not only had to work harder than others, but also work without support from disgruntled colleagues. By the end, though, problem-solving entire missions and saving lives is again dependent upon calculations that only the lone gifted genius can provide.[71] So the film somewhat paradoxically turns to the

resources of individualist maverick labour to convince the audience of the value of superordinate goals; it uses this fantasy as leverage to enliven other, extremely valuable points it makes regarding the fight against workplace segregation. In its visualization of the problems of segregation, the film also makes those problems clearer and so easier to confront, where the actual workers experienced them as more "hidden" costs.[72]

While *Hidden Figures* reclaims the space of nonwhite, non-male labour in an institution key to the American collective imaginary, the filmic compromises were not strictly necessary. As Margot Lee Shetterly, author of the film's eponymous source material puts it:

For better or for worse, there is history, there is the book and then there's the movie. Timelines had to be conflated and [there were] composite characters, and for most people [who have seen the movie] have already taken that as the literal fact … You might get the indication in the movie that these were the only people doing those jobs, when in reality we know they worked in teams, and those teams had other teams. There were sections, branches, divisions, and they all went up to a director. There were so many people required to make this happen. It would be great for people to understand that there were so many more people. Even though Katherine Johnson, in this role, was a hero, there were so many others that were required to do other kinds of tests and checks to make [Glenn's] mission come to fruition. But I understand you can't make a movie with 300 characters. It is simply not possible.[73]
But then again, that is precisely the point of filmmaking: it is the art of suggestion, of illusion. One does not need to film 300 characters in order to suggest them. *Apollo 13* shows us that at the very least there are, in a filmed narrative, visual ways to suggest if not elaborate the transactional teamwork inherent in scientific labour.

In recent years, films like *Gravity* and *Approaching the Unknown* have done away with multiple protagonists almost entirely. *Gravity* effectively removes the problem of individual versus collaborative labour in a spacecraft by including only two main characters, one partially imaginary, and having those characters do minimal problem-solving work. In both films, the technical detail is glossed. Neither are really science advocacy films, as both decenter any elaboration of the technicians' work in order to stress that scientific challenges and mechanical fragility are a mere cipher for psychological challenges and human fragility; these films tend to treat "space" as a very direct metonym or stand-in for human existential feeling.[74] As Nicolas Brinded puts it, "The vast emptiness of outer space is a constant antagonist throughout *Gravity*, and the idea of spinning out into an endless void is terrifying for Stone, and made equally terrifying for the viewer through the use of 3D."[75] While the tension between fraught human interiority and vast, uncaring cosmic exteriors remains philosophically thought-provoking in these pictures, exploring the "aloneness" of space precludes any of the extraordinary feats of human coordination that go into space travel; they are simply not the issue of interest here.

# Conclusion

Given the chronology of the films studied in this paper, it seems not only that the space crisis film is a resurgent generic means for more optimistic discussions of both cooperation across frontiers and our mutual interests in a technology-mediated future, but also that American filmmakers are increasingly turning to individualist tropes in their depiction of space exploration, reinscribing precisely that sense of exceptionalism that, in Brinded's view, science fiction cinema has the opportunity to aesthetically critique.[76] I have made the case that space crisis, science advocacy and science fiction films are all places we look to in enunciating visions for our collective future, and perhaps even establishing shared goals; these need not be merely the goals of the space race or technical achievement, as *Hidden Figures* shows, they may also be goals of inclusivity and compassion. But we are being sold a narrative of ownership alongside these imaginings that simply does not match the inclusive world we yearn for.

This shortcoming may be partially attributable to pressures we observe within the industry to market and sell feature films. Studios and their marketing and public relations departments look for the easiest route to an audience's comprehension and attention: the individualism of auteur narratives, which distill a multifaceted network of contributions into a simpler causality, is one particularly exploitable sense-making shortcut. At the same time, the sole authorship narratives within these crucial imaginative tales are cajoling their audiences; they presume the spectator can only comprehend complex imaginative labour, from film production to space exploration, if it is presented either individualistically, or heroically. Resistance is possible, however: we have seen how some films, such as *Hidden Figures*, have rejected the gender and racial norms of the space crisis film. In a cinematic landscape dominated by the unabashedly individualistic narratives of a superhero multiverse, though, I wonder if there exists an opportunity for us to expect and demand more of a socially transactive complexity from our science fictions? At the very least, it is within the scholar's ambit to encourage the embrace of such complexity. Until then, audiences are being asked to accept distorted and reductive images of progress, presenting us all with a challenge: to demand that our time, our labour, and our intellect be treated with respect.

# Notes

1 Scott et al. "*The Martian*'s ode to science." *Science*, pp. 1432.

2 Maynard-Casely, "The Martian Review." https://theconversation.com/the-martian-review-science-fiction-that-respects-science-fact-48373.

3 Sayles and Howard. Box 15, Folder 17. John Sayles Papers.

4 For a history that focuses largely on the Borderers' influence on current individualist movements such as the Tea Party, see Aaron Barlow (2014, 363–372); for more on the contradictions of individualism, see Claude S. Fischer (2008, 363–372).

5 Perhaps the earliest text making an explicit case of this nature is William Godwin's (1793) individualist anarchist treatise *Enquiry Concerning Political Justice*.

6 Hoover. *American Individualism.*

7 Ibid.

8 Fischer. "Paradoxes of American Individualism." *Sociological Forum,* pp. 363–372.

9 Williams Jr. *American Society*, p. 502.

10 Redmond. "The Whiteness of Science Fiction." *Scope,* pp. 1–21.

11 *2010: The Year We Make Contact* (Dir. Peter Hyams, 1984), released a year after *The Right Stuff*, presents an alternative scenario in which the human protagonists are compelled to collaborate with the posthuman other (HAL), the transhuman other (Dave Bowman), and international others (Soviet and American astronauts).

12 Brinded. "Exceptionalist Discourse and the Colonization." *European Journal of American Culture*, pp. 223–236.

13 Hameed. "The Joy and Fear." *Science*, pp. 695–695.

14 Sachdev. "*The Martian's* Ode to Science." *Science*, pp. 1432.

15 Weir. *The Martian.*

16 For a preliminary look at collaborative innovation, see work on "newness-generation" and "newness-receptivity" (Vissers and Dankbaar 2002).

17 Haigh. "Colossal Genius." *Communications of the ACM*, pp. 29–35.

18 Caryl. "A Poor Imitation." *New York Review of Books*, http://www.nybooks.com/daily/2014/12/19/poor-imitation-alan-turing.

19 See endnote 18.

20 Stasser and Titus. "Hidden Profiles." *Psychological Inquiry*, pp. 304–313.

21 Clifton et al. "Network Structure, Knowledge Governance." *Growth and Change*, pp. 337–373.

22 *Space Cowboys* effectively translates character models from *The Right Stuff* that Sayles (Sayles to Howard n.d., Box 15, Folder 17) disparages as "the good old boys," a conceit he wanted to avoid in his scripting work for *Apollo 13*.

23 Mainar. "Authorship and Identity." *Atlantis*, pp. 27–37.

24 *Gravity* is a notable exception, although this film de-emphasises Dr. Ryan Stone's (Sandra Bullock) problem-solving and mechanical labour, instead exploring her interior crisis.

25 Holt. "How Sexism Held Back." *The Atlantic*, https://www.theatlantic.com/science/archive/2016/06/how-sexism-held-back-space-exploration/486644.

26 This essentialism in practice is perhaps best seen in popular "brain development" tools like *Fit Brains* ("Gender and the Brain" 2014), and it holds that neural dimorphism makes these social differences not just innate, but universal.

27 Weir. *The Martian*, p. 40, 308.

28 Kluger. "What the Martian Gets Right." *Time*, http://time.com/4055413/martian-movie-review-science-accuracy-matt-damon.

29 Due to the triumphant nature of the story, however, none of this stopped NASA harnessing the film's solar system exploration advocacy for its own benefit. The space agency remained close to the production throughout its development, marketing and release (Gipson 2015).

30 Lighthearted conflict can be good for workplace collaboration, where it is not overwhelming or corrosive, as it can encourage others to share specialized knowledge and dissenting views (Turner and Pratkanis 1997). The problem in this case is that the conflict focuses upon aggrandizing the individual and vindicating their solitary labour more so than the sharing of knowledge.

31 Lukancic. "Sleeping Beauty on a Spaceship." *Film Criticism*, http://dx.doi.org/10.3998/fc.13761232.0041.315.

32 See endnote 29.

33 See endnote 14.

34 Although similarly to *Apollo 13* the screenplay for *Alien* has been described as the "composite" work of multiple authors, the Writers Guild of America awarded sole credit to Dan O'Bannon (Littau 2011, 23).

35 Bostick and Robinson. Box 15. John Sayles Papers.

36 Ryan. *John Sayles, Filmmaker*, p. 50.

37 Sayles. Letter to WGA Arbitration Panel.

38 Sayles. 1994. Scripts, Rewrites, *Apollo 13*, Folders 18–27.

39 Ibid., Folder 16.

40 Lovell. "Notes on 1st Revised Sayles Draft."

41 Kluger, Griffin, Bostick. *Technical Notes*.

42 Lovell and Kluger. *Lost Moon*.

43 Hattenstone. "The Frontiersman." *The Guardian*, https://www.theguardian.com/culture/2002/jul/18/artsfeatures.

44 Forbes. "Small Places, Vast Spaces." *Screen Education*, pp. 117–121.

45 In fact, the representation of Gene Kranz (Ed Harris) in particular suggests a good model of productive, egalitarian conflict in a working environment with a tension between open interprofessional management and an antagonism reasonable to the circumstance (apropos Baron 1997; Mitchell et al. 2014).

46 Howard to Sayles. Box 15. John Sayles Papers.

47 Carson. "John Sayles," in *Contemporary American Independent Film*.

48 Howard would later commission Sayles again for a rewrite on *The Alamo* (Dir. John Lee Hancock, 2004).

49 Howard. "Audio Commentary."

50 Howard (2009) also calls it "ironic that, in a way, a film that is so much about a sort of huge collaboration, an emergency effort at that kind of scale, that the film had to be the same kind of collaboration."

51 Johnson. "Interview with John Sayles." *Creative Screenwriting*, pp. 13–16.

52 Baron. "Sayles between the Systems," in *Sayles Talk*, p. 31.

53 Jancovich and Lyons. "John Sayles," in *Fifty Contemporary Filmmakers*, p. 283.

54 Carson. *John Sayles: Interviews.*

55 In Darwinian terms we might refer to this as a "gene-culture coevolution," or phenotypic plasticity within constructed niches (Wilson 1999, 139).

56 It is worth remembering that even new left heroes such as Julian Assange, John Pilger and Slajov Žižek all endorsed Trump's capacity to "break the system" simply because he is, in Pilger's (2016) words, a "maverick" positioned against the system. This kind of individualist ethic can be pervasively bipartisan, and blind to those who must pay the costs for its reductionism.

57 Llinares. "Idealized Heroes of 'Retrotopia." *The Sociological Review*, pp. 164–177.; Opt. "The American Frontier in Film" *Film & History*, pp. 40–51.

58 Chaikin. "Crisis in Space." *Popular Science.*

59 Kroll. "Found in the Stars." *Newsweek.*

60 Marcus. "Review of *Apollo 13.*" *Psychoanalytic Review*, p. 125.

61 Kupfer. *Visions of Virtue in Popular Film.*

62 Marcus. "Review of *Apollo 13.*" *Psychoanalytic Review*, p. 125.

63 Wilson. "In the Blind." CR: *The New Centennial Review*.

64 Greenberg and Solomon. "The Causes and Consequences," in *Public Self and Private Self.*

65 For more on *Star Trek*'s attempts at "reparation," see David K. Seitz (2017) "*Second Skin*, White Masks."

66 Given that this utopia still endorses organizational hierarchy, it is of course not without its Marxist critics (Hassler-Forest 2016).

67 There was one woman working at mission control during the Apollo 13 crisis: Frances "Poppy" Northcutt, whose computer programming skills were instrumental in plotting the Apollo 13's trajectory home (McNutt 1970). This is in addition to the many who provided crucial work from outside mission control. Katherine Johnson and Julian M. Earls were two black workers whose expertise informed the rescue effort (see Hamer and Johnson 1970; Earls 2006).

68 Crouch. "Review of *Apollo 13.*" *The Journal of American History*, pp. 1180–1182.

69 It is worth remembering, of course, that these superordinate goals still only produce workplace motivation and innovation due to competition with another outgroup – the Russians.

70 Sherif. *In Common Predicament.*

71 Pearlman. "Hidden Figures." *Space.com*, https://www.space.com/35145-hidden-figures-right-stuff-history.html.

72 Johnson. "What Matters." *Youtube.com*, https://www.youtube.com/watch?v=r8gJqKyIGhE

73 Pearlman. "Hidden Figures."

74 The existential homily is driven home in *Approaching the Unknown*'s climactic "Our bodies are more space than matter" monologue. This bears comparison to the metaphoric "space" of *Apollo 13* and *The Martian*; along with the ubiquitous existential resonances of the space crisis movie, these two films respectively construct space as a reflection of human limitations and disappointment, and as a playing field on which to demonstrate scientific achievement.

75 Brinded. "Exceptionalist Discourse and the Colonization." *European Journal of American Culture*, p. 232.

76 Ibid.

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