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Amanda R. Keeler

Marquette University, amanda.keeler@marquette.edu

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Visible/invisible: Female astronauts and technology in *Star Trek: Discovery* and National Geographic's *Mars*

Amanda Keeler

Digital Media and Performing Arts, College of Communication, Marquette University, Milwaukee, WI

Abstract

This article examines the newest television programme in the *Star Trek* franchise, *Star Trek: Discovery* (2017–) and National Geographic's part-documentary, part-fictional series *Mars* (2016–). I argue that *Discovery* and *Mars* make visible the depiction of developing technology and a breadth and depth of female astronaut characters, two elements that have been historically marginalised in sf narratives such as *Star Trek: The Original Series* (1966–9). *Discovery* and *Mars* both emphasise the purposeful centrality of female characters and their positions of authority as female astronauts and ship leaders. Each programme also foregrounds the representation and framing of technology, emphasising the not-yet-perfect science and the loss of lives associated with complex space expeditions.

Keywords

Star Trek, gender, technology, astronauts

In the early 1950s, *Collier's* magazine ran a series of articles asserting the inevitability of human travel to Mars. From 'Man Will Conquer Space Soon' to 'Man's Survival in Space', the articles and illustrations provided vivid imagery of then-current science fact blending with theoretical notions of advancing technology. These optimistic accounts by Dr Wernher von Braun and other scientists exemplify the hegemonic imagery of space travel with its central image of the white male astronaut. The involvement of women in the future of space travel, on the other hand, warrants only two minor mentions within the series. The first suggests that women will participate someday 'not as pilots ... but as radio and radar operators', positions deemed suitable for women because of their ability to 'perform monotonous and tedious tasks hour after hour without undue loss of efficiency' (28 Feb 1953, 42). The second appears in an illustration accompanying the article 'Man's Survival in Space: Testing the Men' (7 Mar 1953, 61) in which several women in lab coats (and dresses and high heels) move about while performing unidentifiable scientific experiments outside of the male astronauts' Earth-based training facilities.

While the hegemonic imagery of space travel remains unequal in its representation of gender, these images have begun to shift. The March 2018 issue of *National Geographic* magazine's cover story 'Through an Astronaut's Eyes' features Peggy Whitson, who is credited with spending more days in space than any other American astronaut. Although Whitson and many other women have long participated in space flight programmes in countries around the globe, their visibility has not always been foregrounded in publicly disseminated images and narratives. Whitson's image on the magazine's cover represents an important and *accurate* inclusion that reflects the reality of the presence of women and female astronauts in space programmes. The comparison between these popular press articles (separated by seven decades) illustrates how gender and technology frame both fictional and nonfictional narratives about space travel around the notion of visibility, and inspire sf storytelling across film and television. This shift in visibility over time raises two important questions. First, how does the visibility of women in real-world space programmes change the representation of female astronauts in sf film and television? Second, does this shift in representation help viewers envision a 'science future' of men and women co-existing in space?

To investigate these questions, this article examines the newest television programme in the *Star Trek* franchise, *Star Trek: Discovery* (US 2017–) and National Geographic's quasi-documentary series *Mars* (US 2016–). I argue that both *Discovery* and *Mars* make visible two elements that have been historically marginalised in sf narratives at different moments in the industrial history of US television. First, they both emphasise the purposeful centrality and depth of female characters and their central positions of authority as female astronauts and ship leaders, with 'astronauts' broadly defined here as women and men, either fictional or real, who travel in space, who demonstrate mastery of space technologies, and who otherwise facilitate interstellar exploration. Second, both *Discovery* and *Mars* foreground the representation and framing of technology, emphasising the imperfect science and the loss of life associated with complex space expeditions. As these images are affected by the time period and industrial context from which they emerged, this study will note how these industrial changes are important to consider as well.

The depiction of developing technology and a breadth and depth of female astronaut characters contrasts with earlier sf television programmes like *Star Trek: The Original Series* (US 1966–9). *TOS* presented a complex, future world in which humans and other species had colonised and connected the universe, exploring space aboard intergalactic starships capable of sustaining life, travelling at incredible speeds, and teleporting living creatures between the starship and other environments. Katy Vine observes that fictional media tend to 'dramatize a direct path from the initial spark of an idea to its realization. Decades of hard work and failed attempts are condensed into a brief montage that concludes with triumph' (112). In line with Vine's assessment, *TOS's*

relatively safe, idealised and utopian vision of space adventure de-emphasised the gradual scientific and technological advancements and failed experiments that are central to the movement towards the real-world human colonisation of space. In contrast, both *Discovery* and *Mars* depict a diverse crew of men and women collaborating to ensure their survival and prosperity in space, while exploring the role that technology (and its limitations) plays in these characters' fates. The fate of the crew members on both *Discovery* and *Mars* rests on the success of creating an environment in which male and female astronauts work together in service of the pursuit of technological advancement and survival in space.

Star Trek: The Original Series and Discovery: the old meets the new

The enduring popularity of the *Star Trek* franchise has provided scholars with abundant opportunities to investigate its television programmes and films from a variety of angles. One of the more frequent approaches examines the representation of gender and race, and how these have shifted over time, beginning with *TOS* through *Star Trek: The Next Generation* (US 1987–94), *Star Trek: Deep Space Nine* (US 1993–9), *Star Trek: Voyager* (US 1995–2001) and *Star Trek: Enterprise* (US 2001–5), along with numerous theatrically released films. Since its debut in 1966, *TOS* has been lauded for its forward-thinking sf storytelling, featuring women and people of colour in prominent roles. As Lincoln Geraghty writes,

The multicultural crew that sat aboard the Enterprise was representative of all that America should live up to: Women would be able to assume positions of responsibility equal to men, African, Asian, and Euro Americans would be able to live in harmony after overcoming the divisions of race and racism, and nations once at war with each other could overcome their petty squabbles for the benefit of humankind. (44)

At the same time, *TOS* has also been criticised for the promise of a future world that did not play out in the actual narrative of the show; one in which gender, race, nationality or species did not impede career advancement in the United Federation of Planets, described by Rick Worland as 'a large and powerful socio-political system linking many worlds into a pluralist democracy' (110). While *TOS* is still lauded for transforming television storytelling by including women and people of colour in key roles, as Mary Henderson writes, 'images of women in the original *Star Trek* television series are often confusing, conflicting, and ambivalent' (48). Michael Pringle sums up the inherent contradictions of *TOS*, noting that 'at its best, *Star Trek: TOS* points to a bright future that achieves racial, gender, and class equality, while at its worst, it espouses those values even as it undercuts them with some tired stereotypes' (167). The narrative emphasis on the three main white male characters – Captain James T. Kirk (William Shatner), Mr Spock (Leonard Nimoy) and Dr McCoy (DeForest Kelley) – left the characters portrayed by women and actors of colour, namely Lieutenant Uhura (Nichelle Nichols) and Lieutenant Sulu (George Takei), on the sidelines. Henderson notes that while the show challenged traditional gender roles in some ways, 'the images of women presented in *Star Trek* are in many ways as complicated as the changing roles of women in the sixties decade itself', mirroring the complexities at work outside of the television programme (48). In the real world in the 1960s, women were excluded from many occupations, including the space programme. As Matthew Hersch notes, 'in the space business, women were largely absent, except as wives, mistresses, or support staff ... Spaceflight remained, at least publicly, a distinctly male preserve dominated by masculine discourse and traditional gender roles, very much like the military world that had birthed it' (76). Like the images that appeared in the 1950s issues of *Collier's*, women were present, but remained hidden out of plain sight and sidelined by the oppressive gender expectations of the day.

Scholars have used these conflicting images to assess how different characters and storylines reflect the progressive ideals of equality espoused by *Star Trek's* creator Gene Roddenberry. As Norma Jones notes, 'Roddenberry explained that he had created the original series "to show humans as we really are. We are capable of extraordinary things ... The Enterprise is also a symbol of the vast promise of technology in the service

of humankind” (qtd in [Jones 185](#)). Yet, many scholars recognise that Roddenberry found himself in an impossible position, negotiating with NBC and the show’s production company Desilu to populate the egalitarian world of *TOS* amid the shifting industrial conditions and racial and gender politics of the 1960s ([Pearson and Davies 2014](#)). As Jan Johnson-Smith writes, ‘a desire for equality was clearly integrated within *Star Trek* from Roddenberry’s pilot episode’ (80). *TOS*’s original pilot, ‘The Cage’, featured Majel Barrett as Number One, the cool-headed, logical second-in-command of the starship *Enterprise* (who would eventually appear in a supporting role during *Discovery*’s second season). In Roddenberry’s original outline for the series, he wrote:

The Executive Officer. Never referred to as anything but ‘Number One’, this officer is female. Almost mysteriously female, in fact – slim and dark in a Nile Valley way, age uncertain, one of those women who will always look the same between years twenty and fifty. An extraordinary efficient space officer, ‘Number One’ enjoys playing it expressionless, cool.
(qtd in [Whitfield and Roddenberry 25–6](#))

The network and contemporary test audiences had mixed feelings about a cold, unfeeling woman as second-in-command of a ship, and ‘The Cage’ was summarily rejected by NBC. The network executives ‘felt that the public of 1966 was unprepared to see a woman in such a position of authority’ ([Johnson-Smith 80](#)). The male, Vulcan character Spock took on Number One’s characteristics in a second, successful pilot, ‘Where No Man Has Gone Before’, and thereafter became one of the series’ most iconic and beloved character.

However, these competing interpretations of *TOS* do not detract from the show’s deep historical importance. As Roddenberry and his co-author Whitfield wrote, ‘we hope we are helping to form the concept that present space attempts are not wasted money – or that future interplanetary space travel is not just “wild fiction.” It will be as important to mankind tomorrow as the discovery of America was in its day’ (177). One can consider how a single fictional television programme helped shape a real future in its fantastic image. The visible inclusion of women and actors of colour proved transformative for many viewers, and inspired young women in particular to seek careers in science and technology. Nichelle Nichols, who played Lieutenant Uhura, has recounted a conversation with Dr Martin Luther King Jr, who convinced her to stay on *Star Trek* to serve as a role model for African-American girls and women. He reiterated to her that her performance was important and groundbreaking, representing the ‘first non-stereotypical role in television’ ([Henderson 52](#)). Nichols has also spoken publicly about meeting female *Star Trek* fans at conventions: ‘I’ve heard women say, “I came to this convention just to tell you that because of Uhura, I’m a physicist,” or “Thanks to Uhura’s inspiration, I was able to handle the military”’ (qtd in [Vettel-Becker 168](#)). Whoopi Goldberg, who would later play a recurring role on *TNG*, also credits Nichols as important to her career, noting that she ‘was inspired ... by the presence of a black women playing an officer, not a maid or a comic, as a regular star of an adult series drama on TV’ ([Davies and Pearson 220](#)). With these comments in mind, *TOS* clearly served as a blueprint for negotiating shifting norms in the 1960s and beyond, its inclusion of women and actors of colour predicting and possibly influencing the reality of increasing gender and race diversity in the real-world space programme. As Lincoln Geraghty notes, ‘there are clear contradictions within *Star Trek*’s vision of the future, yet there is also evidence of a strong desire to visualize difference, both physically and culturally, in ways that challenge the audience to make up their minds for themselves’ (45).

Each subsequent programme in the *Star Trek* franchise has provided its own interpretation of Roddenberry’s ideals, most of which have continued a commitment to representing crews that are diverse in gender and planetary origin. *TOS* provides a point of reference from which to compare the other television programmes in the franchise. Nearly two decades after *TOS* aired, *TNG* followed Captain Jean-Luc Picard (Patrick Stewart) as he helmed the *Enterprise-D*. As F.S. Braine suggests, ‘The boys club of the first series ... had been transformed into

the more intimate, respectful, and diverse workplace family of the second' (4). Several of the programme's main characters were women, including Dr Beverly Crusher (Gates McFadden) and Deanna Troi (Marina Sirtis), both provided with the narrative space to develop as complex characters. Likewise, *DS9* and *Voyager*, as Zara T. Wilkinson writes, 'have been lauded for creating a variety of prominent female characters and giving them interesting storylines and internal conflicts not limited to the stereotypically feminine' (220). *Voyager* took the visibility of female astronauts one step further, as it 'positions its three central female characters Captain Kathryn Janeway (Kate Mulgrew), Seven of Nine (Jeri Ryan) and Chief Engineer B'Elanna Torres (Roxann Dawson) in roles of command and authority as they navigate their professional identities ... through unknown space' (Palmer 169–70). But in contrast with the ongoing evolution and expansion of female astronaut characters on the post-*TOS Star Trek* television series, *Enterprise* diverged and stepped back from these depictions of a progressive, inclusive future. In David Greven's assessment, '*Enterprise* represents a neoconservative fantasy of a return to a strong, noble, secure United States of tough liberalism, properly assigned social and gendered roles, all organized around traditional white masculinist values' (5).

After *Enterprise*'s ignoble demise, J.J. Abrams offered a new interpretation of the franchise when he directed *Star Trek* in 2009 and its sequel, *Star Trek Into Darkness*, in 2013. Following these most recent films, Bryan Fuller and Alex Kurtzman again reimagined the franchise in the new television series *Discovery*, the first programme to premiere exclusively on CBS's All Access digital-only channel in the US, and available elsewhere via the streaming service Netflix. Both Fuller, known for creating *American Gods* (US 2017–) and *Hannibal* (US 2013–15) and writing for *Voyager*, and Kurtzman, who created and wrote for *Fringe* (US 2008–13), have extensive experience creating sf television programmes. The influence of their previous work on television appears in *Discovery*, with its rich visual aesthetic in line with *Hannibal* and connections to *Fringe* in its complex, layered storytelling that delves into the limits of the human body and technology (Thurm 2015; Jensen 2013).



'The Vulcan Hello', *Star Trek: Discovery*. CBS All Access. 2017.

Discovery begins with characters assigned to the starship *Shenzhou* under the leadership of Captain Philippa Georgiou (Michelle Yeoh), with Michael Burnham (Sonequa Martin-Green) serving as her first officer, and Saru (Doug Jones) as the ship's science officer. The narrative trajectory of the first season emerges quickly, as the *Shenzhou* unwittingly stumbles upon a Klingon ship. Burnham and Georgiou disagree about what steps should be taken in engaging with the Klingons. For a confluence of reasons, their actions result in a protracted and deadly war between the Federation of Planets and the Klingons. Later in the season, Burnham struggles to find her place again in the Federation after Georgiou's death, when she is stripped of her rank, imprisoned for mutiny, and then saved from this fate by the captain of *Discovery*, Gabriel Lorca (Jason Isaacs). Burnham struggles to come to terms with her romantic feelings for Ash Tyler (Shazad Latif) and his eventual betrayal. Saru, now first officer aboard *Discovery*, scientist Paul Stamets (Anthony Rapp) and crew member Silvia Tilly (Mary Wiseman) must navigate complex interpersonal relationships with Burnham, whom they initially view as merely a disgraced mutineer who has been allowed to return to duty on *Discovery*. While this offers Burnham a chance for redemption, Lorca's redemptive act proves to be a ruse that puts the crew in peril in the mirror 'Terran' universe. All of these overlapping storylines come to different degrees of closure by the end of season one, with hints about season two's narrative trajectory in the final image of the crew on the *Discovery* picking up a distress call from Captain Christopher Pike on the *Enterprise*.

Discovery, like all of the films and television programmes in the *Star Trek* franchise, chooses to align in some ways with the ideals espoused by Roddenberry in *TOS*. Like other sf writers before him, Roddenberry 'was certain he could disguise the fact that he was actually talking about politics, sex, economics, the stupidity of war, and half a hundred other vital subjects usually prohibited on television' ([Whitfield and Roddenberry 19](#)). *Discovery* uses its futuristic setting to engage with social and ethical issues, which come through the narrative when characters question where their allegiances should be directed, and who is to be trusted, with life and death consequences at stake. Thematically, the first season of *Discovery* explores notions found throughout the *Star Trek* franchise. Questions of truth, deception and loyalty arise, as several characters must reassess their feelings about others, such as the work relationship and friendship between Captain Lorca and Burnham, amid the rules and regulations of the United Federation of Planets. Nearly all of the characters confront feelings of alienation and questions of belonging to the Federation, to their biological and adopted families, and to their friends and peers on the starships. In all, these are questions that Captain Kirk, Spock and others wrestled with on *TOS* – timeless struggles meant to indicate the pensive nature and moral complexities of the sentient beings in this diverse narrative universe. Furthermore, because gender does not define which characters are given screen time for this type of deep introspection, these internal character explorations expand the narrative possibilities for both male and female characters in sf television.

While these elements demonstrate how *Discovery* aligns itself with Roddenberry's original creation, the show also breaks from its predecessors in other ways. While *TOS* put its characters in peril on their planetary missions, the main characters ultimately remained reliably safe from harm. Furthermore, this new series is not centred on episodic, planetary missions from which the main characters return safely to their ship. Rather, its serialised season of episodes is built around the deadly war with the Klingons, in which no one is safe from conflict. By the end of episode four, 'The Butcher's Knife Cares Not for the Lamb's Cry' (8 Oct 2017), several characters at the centre of the story have been killed, and by the end of episode eight, 'Si Vis Pacem, Para Bellum' (5 Nov 2017), multiple starships have been destroyed. Thousands of Federation members perish in the Klingon conflict, though a ceasefire appears to be reached near the end of episode 15, 'Will You Take My Hand?' (11 Feb 2018).

Discovery offers a different interpretation of the Federation, in line with both *Enterprise* and Abrams's films. As Gerry Canavan writes, Abrams's '*Star Trek* universe ... was something else entirely. *Trek* only in name: Roddenberry's utopia was replaced by a paranoid and militaristic Federation, scarred and traumatised by loss, seeing space as a site of horror, threat and murder rather than wonder' (321). In discussing Abrams's interpretation of Roddenberry's ideals for his *Star Trek* films, Douglas Brode notes that 'it's reasonable to guess that at some future point, a perhaps still-unborn person of talent will take Abrams's contributions into account while reinventing *Trek* once again' (xxii). Furthermore, Brode suggests that *Star Trek* might best be thought of as 'in a state of flux' in that over time, and through different iterations of the franchise, the characters and situations reflect different interpretations (xxii). If *TOS* was an overly simplistic rendering of a relatively peaceful universe, the films and television series that have followed have peeled away the layers of this utopia-in-progress, exposing the intricacies of the necessary steps towards peace. This deeper exploration of science, technology and power reflects the continuing value of sf storytelling as a way to explore contemporary issues, reflecting Roddenberry's comments about using *Star Trek* to 'disguise' social and economic issues 'usually prohibited on television' ([Whitfield and Roddenberry 19](#)). The darker-toned *Discovery* clearly reflects the current political, economic and social climate, in which the US has now been embroiled in two wars for over a decade, beginning the first conflict with Afghanistan in retaliation for the 11 September 2001 terrorist attacks.

By the same token, discussions about Roddenberry's original intentions must also be filtered through considerations of the television industry of the 1960s and changes that have occurred in the ensuing years. Roddenberry and *TOS*'s writers were limited in what they could depict on 1960s television. Because the storytelling possibilities available today differ so significantly, it would seem foolish for writers not to take

advantage of them. Perhaps the amount of screen time devoted to events on Klingon ships demonstrates one expanded storytelling possibility on *Discovery*. The elaborate depth of character given to several Klingons and their frequent screen presence in some ways acknowledges and allows for the 'enemy' to have more protracted narrative time to define their anti-Federation ideology.

Furthermore, and in relation to the industrial conditions of production, though *Discovery* is deemed a new 'television' programme, it does not appear on a traditional television broadcast network. Instead, *Discovery* is broadcast in the US via CBS's 'All-Access' digital service, while episodes are made available on a weekly basis outside of North America through streaming giant Netflix. To what ends this distribution model will continue to affect future seasons is unclear. Currently, however, there are small, important moments of character development through means previously unavailable. In episode five, 'Choose Your Pain' (15 Oct 2017), Stamets speaks to Tilly and Burnham regarding the Tartigrade and the spore drive. Tilly exclaims, 'You guys this is so fucking cool' before apologising for her informal, profanity-laced language. Yet, Stamets does not chastise her for her comment. Instead, he agrees: 'No cadet, it is fucking cool.' While it would seem a moment in which the writers attempted to 'spice' up the language for the contemporary audience, it is also a moment in which we learn more about Silvia Tilly, a socially awkward but scientifically competent cadet who lacks self-confidence. Tilly is quick to share her feelings and thoughts with Burnham, who seems unaccustomed to people speaking so frankly to her. Her outburst with Stamets demonstrates her excitement about technological advancement, and her quick apology reinforces her complicated childhood with an overly critical mother. This scene also provides Stamets, normally cold and critical of the other characters, a moment in which he can let down his guard and be excited about his scientific breakthrough. The casual profanity helps to reinforce that such expressions of excitement about technological advancement are part of *Discovery's* unique approach to the *Star Trek* franchise, and a diversion from the quotidian use of, and indifference to, advanced technology by characters in *TOS*.

Discovery, gender and technology

While the loss of lives and higher stakes frame the first season of *Discovery*, the ceasefire at the end of episode 15 'Will You Take My Hand?' comes about because of the leadership of several Federation women, such as Michael Burnham, Sylvia Tilly and one Klingon woman, L'Rell (Mary Chieffo). At the centre of *Discovery* are several prominent and important women whose presence suggests not just the visibility of female astronauts but a depth and complexity missing from earlier *Star Trek* programmes. The ubiquity and technological proficiency of the female crew also disrupts the frequent portrayal of a 'natural' relationship between male characters and machines present, for example, in Captain Kirk in *TOS* and Lieutenant Commander Data in *TNG*. This visible diversity in *Discovery* goes beyond the surface level, allowing for the ensemble cast of many different characters to express depictions of science, technology and power, informed by complex and cogent backstories. In this discussion of gender diversity on television, I rely on Amanda Lotz's notion of 'multiplicity'. Lotz writes, 'rather than calling for "positive" representations, cultural studies theorists advocate the creation of a multiplicity of images' in an effort to dismantle 'stereotypes' (12). In contrast to *TOS*, *Discovery* contains a multiplicity of both women's and men's roles in terms of visibility and depth, in line with the popularity of morally complex characters on US television over the last decade. These characters are interesting in part for their imperfections, their flaws, and their 'messiness' as they make mistakes and question their decisions. But despite their complexity, these characters are still guided by a commitment to their career goals as they seek out friendships and positions among their peers.

The most prominent of the women at the centre of *Discovery* ensemble is Michael Burnham, who is situated as talented but complexly flawed. The first episode, 'The Vulcan Hello' (24 Sep 2017), opens with Burnham and Captain Philippa Georgiou on a planetary mission, looking to restore water during a drought. Both Burnham and Georgiou's innermost personality traits are soon revealed, with Georgiou's depiction as the typical, level-headed

Federation captain blended with a maternal warmth towards Burnham earned through their close working relationship. This relationship continues to develop through flashbacks, even after Georgiou's death in the second episode of the season. In contrast, Burnham's central, defining characteristic is her Vulcan 'rationality', a trait attributed to her upbringing as an orphaned human raised by Sarek (James Frain), a Vulcan, and his human wife Amanda (Mia Kirshner). Burnham's character, with the traditionally male-assigned first name Michael, represents a reconceived version of Roddenberry's 'Number One', the 'glacierlike, efficient female' First Officer from *TOS*'s rejected pilot 'The Cage' (qtd in [Whitfield and Roddenberry 21](#)). In Burnham, the cold, logical sensibility that shaped her post-adoption Vulcan upbringing clashes with her human impetuosity. By the end of the first episode, Burnham's Vulcan rationality is displayed only long enough to be questioned and dismantled, creating a fissure that challenges the ship's leadership structure with devastating consequences for its crew members.

While this internal duality stems from her differing species and Vulcan rearing, it is complicated by another factor as well. Burnham left her family to serve under Captain Georgiou, and thus has a deep sense of loyalty to her and to the Federation that conflicts with her rational thinking. This existential dilemma leads her to disobey a direct order from Georgiou, for which she is court martialled, stripped of rank, and exiled to prison for the rest of her life by the second episode of the season, 'Battle at the Binary Stars' (24 Sep 2017). When Captain Gabriel Lorca offers Burnham a chance for redemption, she initially declines, noting that she broke Federation rules and was comfortable paying the price for that. In the season's third episode, 'Context is for Kings' (1 Oct 2017), Burnham decides to join *Discovery*'s crew. Then, over the remainder of season one, Burnham finds some redemption, both within herself and through other characters' acceptance of her continued utility as a Federation astronaut, scientist, technology expert and war strategist.



'Lethe', *Star Trek: Discovery*. CBS All Access, 2017. In a series of flashbacks, Michael Burnham talks with her adopted parents: Amanda, her human mother, and Sarek, a Vulcan.

Sonequa Martin-Green effectively channels the complexity of Burnham's character, torn between the logical training of her adopted Vulcan family, and her biological human sensibilities. In episode six, 'Lethe' (22 Oct 2017), Burnham senses that her guardian/father Sarek is in trouble. They are connected by Katra, a Vulcan shared soul connection, or mind meld of sorts. The episode is built around several flashbacks and cross-mind explorations – Burnham repeatedly flashes back to the day when she learned that she had been rejected from the Vulcan Science Academy. She explores Sarek's mind to investigate why he keeps revising this day and why this moment has such a hold on him. Burnham eventually discovers Sarek's secret: an official told Sarek that only one of his children would be allowed to attend the Academy. He picked Spock, still a very young child at the time, yet regrets this decision. This episode gives Burnham a protracted amount of time to focus on a moment in her past that illuminates the pressure she feels as someone who was trained to be highly logical but also has many human emotions. This formative moment foreshadows further conflict between her biology and her upbringing, creating a complex and imperfect character that will likely continue to evolve and adapt to changing situations in subsequent seasons. Episodes such as this allow the audience to watch Burnham develop, change and grow as a character. *Discovery* thus provides its female characters with dramatic complexity and characterisation in a way never afforded to Uhura, who was seldom the centre of the narrative action on *TOS*.

The breadth of Klingon inclusion in *Discovery* also allows for the development of an important female Klingon astronaut character, L'Rell (Mary Chieffo). Her entrance into the season begins in episode one, 'The Vulcan Hello', when the Klingon warrior T'Kuvma (Chris Obi) persuades his people to attack the Federation. Though T'Kuvma is killed in episode two, 'Battle at the Binary Stars', Voq (Shazah Latif) takes on T'Kuvma's charge and continues to work to reunite the Klingons. After internal strife amongst the Klingons, Voq is banished in episode four, 'The Butcher's Knife Cares Not for the Lamb's Cry', and L'Rell, who cares deeply for Voq, protects him from the other Klingons by hiding him on the wrecked remains of the starship Shenzhou. L'Rell enters and exits the main storyline several times over the season, reappearing again in episode five, 'Choose Your Pain', when the Klingons kidnap Captain Lorca. While in captivity, Lorca encounters a character named Ash Tyler (Shazah Latif) and rescues him from imprisonment. While Tyler's post-traumatic nightmares seem natural given his months of torture at the hands of the Klingons, it soon proves more complex than this. He discovers that he is actually Klingon and that L'Rell has mutilated Voq's body and reprogrammed his mind as a test case for a 'species reassignment protocol'. In what might be described as a human-Klingon sleeper-cell, Voq's original personality slowly reasserts control over the Tyler persona; the inner battle means this experimental body is neither Tyler nor Voq, but an amalgam of the two that cannot reconcile its split personality. At the conclusion of the season, in episode 15, 'Will You Take My Hand?', L'Rell tells her fellow Klingons that they have lost themselves in the war with the Federation of Planets and that she will lead them to a 'reunification of our race'. While they initially laugh at her, they accept her in this regard. Her success in reuniting the Klingons is particularly striking in that, in one of the few overt discussions of gender, she tells Admiral Cornwell (Jayne Brook) that Klingon women are not considered leaders by the male Klingons. Yet she effectively persuades her people to reunite the 24 Klingon houses by displaying foresight in her elaborate species reassignment of Voq/Tyler and long-term strategy instead of the base aggressive tendencies that usually define her fellow Klingons.

Other, smaller women's roles are also important; several are particularly fascinating in the light of one of the overarching thematic foci of *Discovery's* first season. In a sense, one of the biggest obstacles for the characters comes not from external danger but from an inner fissure that makes each character question their own thoughts and instincts. Many of the characters' narrative arcs involve confrontations with their own 'other', both figuratively and literally, as the Terran mirror universe is populated by many of the characters' doubles. For Silvia Tilly, her double is a self-assured and bold starship captain, a vast departure from her over-explaining, timid cadet persona. The wise and maternal Philippa Georgiou's doppelganger is ruthless and bloodthirsty, fittingly so as she turns out to be the mirror-universe Terran Emperor. For L'Rell and Tyler/Voq, this doubling occurs within them. L'Rell must walk among the Klingons and follow their murderous, warrior ways, yet she saves Voq from death and works to reunite the Klingons. Tyler/Voq's internal struggles result from scientific experimentation, as he is at once human and Klingon. Interestingly, each of these internal and external splits alludes to questions of nature versus nurture, as does Burnham's split between human emotions and Vulcan instincts. These doubled characters and internal divisions allow for complex character development and deep introspection into how these characters are products of both their biological nature and the ways in which each was reared, and how the lines between these influences are always blurred and complex.

The presence of a hybrid species – the half-human, half-Klingon Tyler/Voq created by L'Rell – focuses attention on another central theme in *Discovery*: the development and improvement of technology. As previously discussed, the gradual nature of technological and scientific advancement is often glossed over in the hegemonic imagery of space travel depicted in sf television. Many of the *Star Trek* programmes tend to focus on already-developed technology and its computational and non-biological roles. This tendency disregards the progression towards the scientific achievements that made space travel possible. Within the protracted conflict that ensues, *Discovery* makes technology and its shortcomings visible, including the imperfect science-in-progress that eventually threatens the future of the Federation. Two technological elements that frame season one are foregrounded as deeply integral to the narrative development of the season. The fates of both the

Federation and the Klingons rest upon the successful scientific development and understanding of experimental technology by both sides. The Klingons are able to destroy human starships because of their 'cloaking device', which hides their ships from detection by the Federation. On the other side, *Discovery* is developing a 'spore drive', which allows jumps from any place in the universe to any other in seconds. However, the spore drive operates not only as a human-developed technology, but relies on a biological entity to activate the spore network. The creature, a Tardigrade that the crew names Ripper, connects the spore drive and the spores in a process that also injures it, and eventually Stamets as well, who enables his human body to serve in Ripper's place once they set the creature free to save its life. This biological necessity harkens back to pre-combustion-engine labour, which was dependent on horses, mules and other animals in the development of food and transportation for humans. It also alludes to human manual labour, which has been rendered largely invisible throughout *Star Trek*. While we therefore may see the technology in *Discovery* more closely than in *TOS*, we still do not know who builds the technology, only those that initiate its scientific development.

National Geographic's Mars, gender and technology

Discovery is not alone among contemporary television programmes in rethinking how gender and technology are depicted. It is paralleled in another show, National Geographic's *Mars*, that communicates not speculative sf but an inevitable 'science future' of human existence in space. Executive producer Ron Howard notes that *Mars* 'began as a documentary and we thought, "This could be a series." We began to delve and found such good storytellers. We realized this could be so cinematic: What would it feel like to be there? On a thematic level, it celebrates exploration in a visceral way' (qtd in [Science 687](#)). Like *Discovery*, *Mars* does not air on a traditional broadcast network, but rather the cable channel National Geographic, established in 2001 and owned by 21st Century Fox. Cable channels allow for a broader narrative range than was historically possible on traditional broadcast networks which were beholden to the Federal Communications Commission (FCC) in terms of the subject material deemed appropriate for general audiences. Basic cable channels like National Geographic and SyFy have also created unique spaces on television for narrowcast programming that does not need to appeal to all audiences. Well-respected sf programmes have thrived on SyFy, from reruns of *Lost* (US 2004–10) and *TOS*, to original programmes such as *Battlestar Galactica* (US 2003–9) and *Legion* (US 2017–). Born out of the legacy of *National Geographic* magazine (1888–), *Mars* is inflected with a sense of scientific accuracy. *Mars*'s hybrid storytelling mode, containing both fiction and nonfiction segments, and its short, six-episode season, demonstrate a type of programme well suited for cable audiences – one that would prove to be popular among a niche audience drawn to science and sf programming. *Mars*'s first episode garnered over 1.4 million viewers ([Mars ratings 2016](#)).

The overall increased visibility of women in the space programme is reflected in both the documentary and fiction portions of *Mars*. The nonfiction segments of *Mars* feature archival film footage and photographs alongside interviews with contemporary scientists such as Jennifer Trosper (Project Systems Engineer, Jet Propulsion Laboratory) and Neil Degrasse Tyson (Director, Hayden Planetarium), authors Andy Weir (*The Martian*, 2011) and Stephen Petranek (*How We'll Live on Mars*, 2015), former astronauts John Grunsfeld and James A. Lovell, and several employees of Space X, including CEO and Lead Designer Elon Musk and Shana Diez, Director of Build Reliability. These real-world experts discuss the avenues of science and research that will be necessary for the technology of long-term space travel to develop from theory to practice. Across the first season of *Mars*, these interviewees grapple with the risks and effects of radiation and reduced gravity on human bodies, the difficulty of landing on Mars, the need to design and build reusable rockets, and the power sources, food, water and equipment necessary to sustain human life on Mars. All of these issues are discussed frequently in both the documentary interviews and the fictional narrative portions, ultimately focusing on two key ideas. First, the colonisation of Mars will transform humans into an interplanetary species, perhaps evading human

extinction if a catastrophic extinction event occurs on Earth. And second, *Mars* emphasises humankind's inherent curiosity and need to continue exploring the unknowns of the universe.

This exploratory mentality defines the series from its beginning. The first episode, 'Novo Mundo' (14 Nov 2016), opens with a voiceover telling the audience,

We dream. It's who we are. Down to our bones, our cells. That instinct to build. That drive to seek beyond what we know. It's in our DNA. We crossed the oceans, we conquered the skies. And when there were no more frontiers on Earth we launched ourselves among the stars. The heavens beckoned a new generation of innovators and explorers, seeking to take human kind even further.

The viewer soon learns that the fictional science 'future' portions of *Mars* take place from the year 2033 onwards. The voice belongs to 'American mission commander' Ben Sawyer (Ben Cotton), who will lead a group of astronauts – three women and three men – representing many countries, including 'Korean-American mission pilot' Hana Seung (Jihae), 'Spanish hydrologist and geochemist' Javier Delgado (Alberto Ammann), 'French mission physician and biochemist' Amelie Durand (Clémentine Poidatz), 'Nigerian mechanical engineer and roboticist' Robert Foucault (Sammi Rotibi) and 'Russian exobiologist and geologist' Marta Kamen (Anamaria Marinca) ([Mars press release 2016](#)). While many of the fictional scenes revolve around the Mars mission crew as they travel to and live on Mars, they also feature the Earth-based headquarters and mission control centre of the International Mars Science Foundation (IMSF). These scenes frequently focus on Ed Grann (Olivier Martinez), an Elon Musk-like character consumed by his desire to send a crew to Mars and set up a permanent colony. Grann most frequently interacts with Joon Seung (Jihae), *Daedalus* pilot Hana Seung's twin sister, who at first serves as the 'CAPCOM of mission control' and later 'secretary-general' of the IMSF ([Mars press release 2016](#)).



'Novo Mundo', [Mars](#). National Geographic, 2016.

Women and men appear in both the nonfiction and fiction segments, acknowledging that women are and will continue to be integral to space science and exploration. The images of current experimental technology under development at Space X show an inclusive space with female and male scientists and engineers working to perfect the technology necessary to build 'reusable' Mars rockets. Nonetheless, the hegemonic imagery of space travel remains visible in the historical record chosen to be featured in the nonfiction portions of the show. These segments echo the images present in the 1950s *Collier's* magazine articles about the future of space travel by making women largely invisible despite their historic importance to the space programme. For example, in 'Novo Mundo', former astronaut and *Apollo 13* Commander James A. Lovell notes 'there's a segment of people in this world that live on the edge', describing the type of people drawn to dangerous explorations on Earth and in space. While Lovell speaks, archival film footage cycles through images of famous explorers and missions – seemingly all men with the sole exception of Amelia Earhart, the famous aviator who disappeared in 1937 on a solo flight around the world. While this inclusion of Earhart acknowledges that women were also interested in charting unknown territory, the overwhelming majority of the film footage and photographs that illustrate Lovell's commentary feature male explorers. In *Mars's* second episode, 'Grounded' (21 Nov 2016), several images of women appear – though once again they reinforce the hegemonic imagery associated with the US space programme. Here, another former astronaut, John Grunsfeld, says in his interview: 'I think some people

are genetically programmed to want to go somewhere, to leave their home and explore. You know you have to be very comfortable losing that connection to those you've left behind.' Next, Lovell continues: 'The type of person that you select to go to Mars has to have a family that understands the risks.' As he speaks, a montage of images appears, beginning with a photograph of two male astronauts in spacesuits, each with their wives and children eagerly greeting them. In a subsequent photograph, two women and small children gaze up at the sky, as if at a shuttle launch. Another photograph appears, this one featuring several women and children staring at a television screen in a living room. These images are meant to reflect and represent what Lovell says next: 'My wife stayed home, hoping that I would not fall into some tragedy that I couldn't get out of.' These photographs show the patient wives and children waiting at home for the men to return safely – largely overlooking images of female astronauts from the ensuing decades such as Sally Ride, Mae Carol Jemison or Eileen Collins.

Although the documentary segments in *Mars* rely heavily on the hegemonic imagery of white, male astronauts to discuss the history of the American space programme, its fictional 2033 scenes work to counter this prevailing (though inaccurate) narrative. Its fictional segments make visible several female astronaut characters, foregrounding the equality of its crew and the complex technology at work as the first human inhabitants of the planet Mars struggle to survive. The technological and psychological complications that arise provide the show with opportunities to present the crew members as complex and nuanced characters. *Mars* frames its character developments through these technological issues, highlighting the inherent dangers of the human exploration of unknown territory across all six episodes in the first season. In the first episode 'Novo Mundo', Ben Sawyer commands the crew as they prepare to leave Earth through their arrival on Mars. But when an equipment malfunction occurs during the landing on Mars, Ben's leadership propels him to sacrifice his life to save the other astronauts. Before he dies in the second episode, 'Grounded', Ben appoints Hana Seung mission commander, and from there on she works with the other remaining astronauts to overcome numerous technological issues that arise. The other characters do not treat her command any differently than they did Ben's, and they continue to conduct scientific experiments, agricultural cultivation and planetary explorations within the constraints of their foreign environment.



'Pressure Drop', *Mars*. [National Geographic, 2016](#).

Like *Discovery*, *Mars* explores the bumpy technological path towards space travel. However, unlike *Discovery* and the other *Star Trek* iterations, *Mars* is set in the near future, highlighting the difficulties of technological development rather than leaping over these obstacles by setting the narrative several hundred years in the future. *Mars*' characters' lives are in constant and very real danger, with great peril in every small problem that occurs. Once on Mars, the crew must confront a series of issues, including finding water, setting up a permanent settlement, powering the facility, growing food and dealing with unexpected weather and climate challenges – all exacerbated by a ten-minute delay in communications with Earth. This delay makes for interesting narrative development, as the viewer experiences dramatic moments twice, first as the characters on Mars experience a setback, and again as the people working in mission control react. The delay between the characters speaking in one place and the movement of voice, image and other information to distant locations raises the tension in moments where survival is unclear. It also situates these astronaut characters as expendable. The crew members are not on Mars as particular individuals destined to live and thrive – they are

risking their lives to demonstrate the viability of Mars colonisation. In 'Novo Mundo', the astronauts must face both the prospect of Ben's fatal injuries and the fact that their ship's malfunction has sent them off course without the equipment to transport them quickly or safely to their intended habitat. The astronauts realise that they are 75.3 kilometres from the basecamp that was to serve as their home for two years on Mars, but closer to an existing Russian workshop module that houses a 3D printer that can help them repair some of their equipment. In episode three, 'Pressure Drop' (28 Nov 2016), the crew finds the tight quarters of their temporary base camp unsustainable, and a fire renders the space untenable. With help from the Earth-based mission control, they locate an ancient lava tube near frozen water where they can deploy their permanent home below Mars's surface, protecting them from the radiation in the thin atmosphere. In episode four, 'Power' (5 Dec 2016), several years pass as a second ship, *Vega*, and a third ship, *Cygnus*, bring new astronauts. By 2037, the rapid expansion of their Martian home, now called Olympus Town, brings about mortal danger as Oliver Lee (Nick Wittman) is gravely injured during a power systems upgrade.

Throughout the season, inhospitable conditions on Mars continue to slow the expansion of the living quarters, science laboratories and the greenhouse. In episode five, 'Darkest Days' (12 Dec 2016), the crew struggles against several unforeseen obstacles, including the diminishing power available due to a months-long dust storm that blocks sunlight from reaching the station. Two astronauts, Javier and Robert, leave the settlement in dangerous conditions during the storm to restore power to Olympus Town. Robert successfully finds the power cable against seemingly insurmountable odds, and soon the storm passes and the sun reappears. Despite this joyous moment, episode five's title 'Darkest Days' has both literal and figurative meaning in terms of the lack of sun and the depressive fugue that has settled over Olympus Town. While working to restore power to the settlement, Javier and Robert's conversation reflects the profound psychological effect of humans displaced from their home environments:

JAVIER:

Do you still think about it, the ocean?

ROBERT:

Every day. Trouble is, every time it's like the waves are getting a little quieter.

JAVIER:

Like someone's turning down the volume.

ROBERT:

Yeah, last week I realised I couldn't even remember what the ocean sounded like. (Episode five, 'Darkest Days')

This kind of crushing, emotional homesickness, compounded by the frustration of constant technological issues, is only rarely seen in characters on *Star Trek*.

Amid the dangerous conditions on Mars and at Olympus Town, most of the astronauts thrive as they perform their experiments. However, the psychological distress of physical displacement on another planet affects some of the colonists. The third ship, the *Cygnus*, delivers two new astronauts to Mars: Leslie Richardson (Cosima Shaw), a 'logistical engineer' tasked with upgrading their power systems, and her husband Paul Richardson (John Light), a botanist brought to Mars to improve plant growth in the greenhouse. Paul does not adjust to Mars as well as the previous astronauts, and when the dust storm forces power reductions, he breaks down mentally, apologising repeatedly to his dying plants in the greenhouse and complimenting the ones that remain alive. Just when Olympus Town begins to normalise after the power is restored and the storm passes, Paul hallucinates that the airlock door in the greenhouse is the door to his garden back on Earth. Caught in his delusion, he opens it, thereby killing himself and six other colonists. The focus on Paul's problems adjusting to Mars subtly critiques the *Collier's* 1950s articles on space travel, which frame male astronauts as being ideal space travellers, capable

of handling the psychological pressures of being away from Earth. *Mars* subverts this antiquated assumption by making Paul's death the catalyst that allows a team of female astronauts to make the most important discovery yet on Mars.

Just as Tillie and Stamets expressed great excitement over the spore drive on *Discovery*, Paul's death leads two astronauts, Leslie and Marta, to combine their scientific knowledge and ingenuity to advance the mission into its next phase. Leslie and Marta had met in the previous episode, 'Power' (5 Dec 2016). Leslie arrives full of optimism about upgrading the power, and politely challenges Hana's insistence that she manage her expectations for the speed at which she will be able to carry out her work. Hana tells her that the simulations of Mars on Earth cannot really demonstrate the true difficulties of working with Mars's constantly shifting sand dunes. Leslie tells Hana, 'No, I value your opinion, I do. And I know you've been through a lot up here. But I have an assignment and I would really appreciate your support in executing it' (in 'Power'). Marta and Leslie have a similar interaction upon meeting, and begin their working relationship with some tension. However, in the season's final episode, 'Crossroads' (19 Dec 2016), Leslie turns her attention to Marta's research as a distraction from her husband Paul's death. Marta and Leslie subsequently combine their scientific knowledge in the pursuit of Marta's research. With Hana's support, the three women travel to retrieve a soil sample that demonstrates evidence of life on Mars, renewing the IMSF's commitment to the Mars mission and providing the show with its most effective moments of character development.

Much like *Discovery*, *Mars* is striking in its refusal to draw attention to the fact that a female astronaut and a woman of colour, Hana Seung, becomes the commander of the mission on Mars. Few characters ever question her authority. Though some tensions appear between Hana and Leslie, this conflict is not framed as gendered, but rather that of characters questioning the settlement's power structures, community oversight and scientific expertise. The absence of character dialogue addressing gender, race or nationality suggests that these antiquated notions are no longer relevant in this near-future vision, similar to what many scholars have argued about Roddenberry's casting choices for *TOS*. *Mars* also does not make explicit connections between the historical images presented in the documentary portion of the series and the fictional scenes set in the 2030s. While the overall programme does not overtly ask viewers to consider the incongruity between photographs of the past and depictions of an egalitarian future, the diversity of the original 2033 *Daedalus* crew is a strong message about the present and future of female astronauts, disrupting the 1960s notion of who is and who is not allowed to be a space explorer.

Conclusion

In this article, I have explored the centrality and complexity of female astronauts as characters and the depiction of developing technology in the sf narratives of *Star Trek: Discovery* and *Mars*. Both programmes feature diverse crews of men and women working together to ensure their survival in space. Each programme gives its female astronauts the narrative means and opportunity to demonstrate individual intellectual prowess, which also serves as a metaphor for the real-world competence and contributions of female astronauts. Roddenberry's push to include women and actors of colour in *TOS* challenged television programming as much as was possible at the time. Within an expanding array of distribution platforms and spaces on television, *Discovery* and *Mars* are able to create more challenging narrative worlds that examine the technology and labour that allow women and men to explore the universe together. At the same time, it must be acknowledged that *TOS* presented its own idealised world that made women and actors of colour into central characters, yet overlooked the need to tell the stories of how these characters achieved their positions. The focus on these near and far futures too neatly erases and makes invisible these struggles. The implications of this erasure point to the need for continued scholarship on sf television programmes, particularly at the

intersection of media studies with other disciplines and methodological approaches, such as feminist science studies and transhumanism.

Like much sf, both programmes' overt representation of technology in progress can be read as a commentary on the state of science and technology today. Technology has always been at the centre of the *Star Trek* franchise, but our continuing interest in space exploration and colonisation makes sf television programmes ideal vehicles to explore our contemporary world. Science and technology are advancing at an unprecedented pace, with unintended consequences that threaten to destabilise long-cherished tenets of democratic society. On *Discovery*, the characters grapple with similar issues in their rapidly changing fictional world, simultaneously problematising and acknowledging the honoured traditions of the United Federation of Planets and Roddenberry's original vision. *Mars* uses its hybrid storytelling mode to connect the history of the space programme in the US to our possible future as we move towards colonising Mars. Together, these two programmes demonstrate not just new ways to tell sf stories, but perhaps a path towards a more inclusive world irrespective of race, class and gender. Whether that world will be found on Earth or in space remains to be seen.

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