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***Star Trek* Discovers Women: Gender, Race, Science, and Michael Burnham**

Amy C. Chambers

Introduction

Michael Burnham, and in turn Sonequa Martin-Green, brings women of color, and specifically black women, from the margins to the center of the narrative world of *Star Trek*¹, by building upon the limited but often groundbreaking secondary character representation the *Star Trek* franchise has offered to women of color in its more than 50-year history. Women of color who have held significant roles in *Star Trek* include: Uhura (Nichelle Nichols *Star Trek: The Original Series*, 1966-69²); Guinan (Whoopi Goldberg, *The Next Generation*, 1988-1993); Keiko O'Brien (Rosalind Chao, *The Next Generation* 1991-1992) and *Deep Space Nine*, 1993-1999); Kasidy Yates-Sisko (Penny Johnson, *Deep Space Nine*, 1995-1999); B'Elanna Torres (Roxann Dawson, *Voyager*, 1995-2001); and Lily Sloane (Alfre Woodward, *First Contact*, 1996). Now in *Discovery*, Michael Burnham and Captain Phillipa Georgiou (Michelle Yeoh) place women at the center *alongside* a cast of secondary women of color characters including Dr. Gabrielle Burnham (Sonja Sohn), Joann Owosekun (Oyin Oladejo), Ellen Landry (Rekha Sharma), Dr. Pollard (Raven Dauda), May Ahearn (Bahia Watson/Claire Qute) and Queen Me Hani Ika Hali Ka Po (Yadira Guevara-Prip). *Discovery* offers 'visible diversity' that goes 'beyond the surface level... [expressing] depictions of science, technology and power, informed by complex and cogent backstories.' (Keeler, 2019, 136). These women on *USS Discovery* are not only part of a diverse crew, but also part of a community of women of color who have narrative agency and complexity – they are not presented as exceptions or anomalies but instead normalized as part of the wider demographics of the show.

Burnham is revolutionary in terms of the role she plays as a black woman scientist and a black woman protagonist in the *Star Trek* universe. Burnham and Captain Georgiou are introduced to viewers tracking across a desert-planet discussing their current mission with the science vessel *USS Shenzhou* to save an alien species from extinction. *Discovery* takes place in the *Star Trek* timeline prior the adventures of the crew of the *USS Enterprise (The Original Series, 1966-69)* including Burnham's own adoptive brother Spock (played by Ethan Peck in

¹ The concept of drawing black women from the margin to center of narratives is taken from bell hooks' 1984 (revised second edition, 2000) text *Feminist Theory: From Margin to Center*. South End Press.

² The first *Star Trek* series has been retrospectively named (by fans and scholars) *Star Trek: The Original Series* to provide clarity and resist confusion between the different series found in the televisual *Star Trek* franchise storyworld. Individual *Star Trek* series will be referred to by their subtitles throughout this chapter, e.g. *Star Trek: The Original Series* is *The Original Series*; *Star Trek: Discovery* is referred to as *Discovery*; *Star Trek: Voyager* is *Voyager*; and so forth.

season 2). Burnham was adopted by the Vulcan ambassador to the United Federation of Planets Sarek (James Frain) and his human wife Amanda Grayson (Mia Kirshner) – Spock’s biological parents – after Burnham’s own parents are both believed to have been killed by Klingons. At the time of her graduation from the Vulcan Science Academy, Michael Burnham was the only human to have graduated from the institution – she graduates first in her class – but is rejected from the Vulcan Expeditionary Group because of her species (human). She instead joins Starfleet and trains in xenanthropology – a bioscientific and anthropological specialism that defines her as an expert in first contact. Burnham’s mutinous actions in the first two episodes of the first series shift the focus of the work of *Shenzhou* and later *Discovery* from science to war as all ships are made available to the war effort against the Klingons. Once seconded to the crew of the *Discovery* it is revealed that the captain of that ship, Gabriel Lorca (Jason Isaacs), engineered her arrival believing that he could use her advanced scientific knowledge to weaponize the technology onboard; rather than science for the advancement of knowledge the *Discovery* becomes a science vessel for the advancement of war. Lorca manipulates Burnham, just as he does Starfleet and the crew of the *Discovery*, by explicitly rejecting the idea that his commitment to the spore drive research is militaristic in ‘Context is for Kings’ (1x03) – a lie that is rapidly exposed as the war continues. Throughout much of the first season Burnham acts as a bridge between the scientific ambitions of Stamets and the military motivations of Lorca as she listens to both of their perspectives and negotiates the tension between scientists and the military. Although defined as a xenanthropologist professionally, it is Burnham’s extensive knowledge of both physics and biology that ultimately saves her from life imprisonment and progresses research on the spore drive that ultimately averts *Discovery*’s decimation at the hands of the Klingon fleet.

Stories about women scientists tend to focus on their relationship to/with/against men ‘omitting any overt mention of race,’ but the *Star Trek* franchise has offered a speculative space where the complexities of ‘gender and race interact’ (Roberts, 2000a, 205). *Voyager*’s Katherine Janeway (Kate Mulgrew) was ‘bestowed the ambiguous honor’ of being the first woman Captain on a titular vessel (Dove-Viebhan, 2007, 597), and also the first woman scientist to feature as a lead character. Janeway as a character must ‘tread carefully between the possible indictment of mannishness on the one hand and the accusation of hyper-femininity on the other’ in taking a role and a position in a franchise that had only been previously occupied by white men (597). She trained as a Starfleet science officer (speciality unknown) and built and worked with a team of women scientists including astrophysicist Seven of Nine (Jeri Ryan), and engineer B’Elanna Torres (Roxann Dawson). Roberts (2000a, 206) argues that

both Torres and Seven of Nine are coded as ‘bi-racial’ because they are ‘mixed-species female alien’. *Discovery* is Burnham’s story but many of the major plot twists of season one are driven or shown to have been manipulated by a man: Captain Lorca. Nevertheless, with the introduction of Michael Burnham *Star Trek* places a black woman scientist at the centre of the narrative world rather than at the margins of a(nother) white person’s story.

Women scientists are often seen as anomalous exceptions and ‘sidelined in subordinate roles’ in the fictional (and indeed real) world of white, male-dominated scientific research (Simis, et al., 2016, 93). Even in the supposedly race- and gender-blind future of *Star Trek*, a black woman science specialist is still considered ground-breaking. Yet, despite this unique positioning of a black woman in a major science fiction franchise, Burnham’s representation as a scientist still sees her aligned with some of the limiting stereotypes repeatedly applied to women (fictional and non-). Her representation is complicated by including the hard/soft science binary where women scientists are affiliated with the biosciences; the presentation of women in science as almost impossibly brilliant polymaths whilst also being defective women (neither successful mothers or lovers); and approaching science from a gendered (feminine/caring/softer) perspective.

There is very little scholarship written on the representation of black women in science fiction – they do appear scattered across the history of moving image Anglo-American science fiction in part due to the unprecedented success and continuing receivership of Uhura/Nichols (O’Keeffe, 2013), but they have often been overlooked by (predominately white) scholars. Adilifu Nama’s book *Black Space: Imagining Race in Science Fiction Film* (2008) constituted the first intervention into the scholarship surrounding Anglo-American science fiction and its failure to consider the representation of race.³ Nama (2008, 128) presents poststructuralist readings of science fiction exposing the ‘black allegories’ in ‘white narratives’, claiming that the dearth of black faces ‘signals a normalization of white supremacy in the future’ and the perpetuation of institutionalised racism in these imagined futures (25). Despite the originality of Nama’s monograph, the work does not fully consider the representation of black women as a doubly marginalised group with the majority of examples analyzing male characters and

³ This lack of attention in scholarship is relatively specific to moving image media. Although Mafe and Nama’s monographs are the only book-length studies to specifically deal with the representation of race in science fiction cinema, thus far, the question of race and science fiction literature has been the subject of several texts. Key texts include: Sharon DeGraw, *The Subject of Race in American Science Fiction* (London: Taylor & Francis, 2009); De Witt Douglas Kilgore, *Astrofuturism: Science, Race, and Visions of Utopia in Space* (Philadelphia: University of Pennsylvania Press, 2003); Isiah Lavender, *Race in American Science Fiction* (Bloomington: Indianan University Press, 2011); John Rieder, *Colonialism and the Emergence of Science Fiction*. (Middleton: Wesleyan University Press, 2008); Elisabeth Anne Leonard (ed.). *Into Darkness Peering: Race and Color in the Fantastic* (Westport, C.T.: Greenwood Press, 1997).

male-centric narratives. Diana Adesola Mafe's *Where No Black Woman Has Gone Before: Subversive Portrayals in Speculative Film and TV* (2018) offers the first book-length analysis of black women in SF. Mafe argues that the lack of scholarship on an already massively underrepresented group 'speaks to the erasure of black women not only in the speculative genre but also in scholarship about the genre' (2018, 11). Women of color experience a double blind as they are often offered little representation onscreen and then even less attention in scholarship.

Black women have been historically analyzed either in terms of their race *or* their gender – but rarely if ever as a complex raced and gendered subject. As Mafe (2018a) notes, with reference to the work of Mary Anne Doane (1991), discussions of women in fiction are usually assumed to refer to white women and the term black is almost exclusively aligned with black men. Doane (1991, 231) surmises that: 'What is lost in the process is the situation of the black woman. Her position becomes quite peculiar and oppressively unique: in terms of oppression, she is both black and a woman; in terms of theory she is neither.' Yet, with the recent popularity of black-led science-based fictions such *Hidden Figures* (2016), *Black Panther* (2018), and *Discovery*, black women are not only offered representation but firmly placed at the center of science-based narrative worlds. Spaces are opening up for future narratives and characterizations that do not require black women to be doubly oppressed by both creative and academic communities. Crucially, the critical and indeed financial success of these black-led science-based texts have shown that having a normalized black woman scientist as a main – if not *the* main, in the case of Michael Burnham – character does not constitute a barrier to financial or critical success.

Representing Science and Women Scientists in *Discovery*

Science and technology and their imagined futures provide a backdrop for the *Star Trek* universe. The theory and practice that gives the narrative a spectacular speculative frame is often perceived as neutral (or at least benevolent) as Starfleet explores the universe. As the series progresses and specifically across the arc of episodes that introduces the science of *Discovery*,⁴ the series' key scientific fields are identified as biology and physics – the two in which Burnham has expertise. She is a professional xenanthropologist (the study of extra-

⁴ The 'science' that underpins the first series of *Discovery* is established across three episodes (episodes 3, 4, and 5 in season 1). These episodes develop the concept of the Spore Drive, the series' focus on the relationship between biology and physics, and establishes the aptitude and scientific practice of the main character – Micheal Burnham – as a woman of *many* sciences.

terrestrial cultures), but throughout the series there are multiple references to her knowledge of ‘high-level physics’ and ‘quantum mechanics.’ Her expertise across these two scientific fields, once she is able to combine them, make her invaluable to the crew and the narrative as it is revealed that *USS Discovery* travels using an organic propulsion network. The ‘intergalactic ecosystem’ of the mycelial network has the potential to offer an infinite number of interstellar pathways that allow for very accurate instantaneous travel across the known universe and all other quantum realities. But when Burnham is transported onto the *USS Discovery*, as fabricated by Lorca, it is not to in the service of the impartial altruistic science, as suggested in Burnham’s initial introduction and Lorca’s duplicitous proclamations (1x03), but rather one that uses her specific scientific expertise to gain a tactical advantage in combat and break into the mirror universe.

Historically, scientists have been represented in Anglo-American media as ‘white, privileged American males’ and on the whole, this has not changed (Kirby 2017,292). There has been a recent wave of black women scientists appearing on both the small and silver screen, but *Black Panther*’s Shuri (Letitia Wright), NASA’s *Hidden Figures* (Dorothy Vaughan [Octavia Spencer], Mary Jackson [Janelle Monáe], and Katherine Johnson [Taraji P. Henson]) and the Burnhams (both mother and daughter) on *Discovery* are still the minority in the small group of women scientists being offered as representation. Studies on women scientists in fictional media from key critics including Jocelyn Steinke (2018, 2010, 2005) and Eva Flicker (2003, 2008) have shown that women are underrepresented when compared to men. Diane Adesola Mafe has argued that even when women are offered space on science fiction screens they are predominately privileged white women who often work to reinforce ‘white male authority’ (2018a, 2). The paucity of women scientists on screen also emulates the dearth of women and specifically women of color in the sciences in reality. But representation is not simply about reflecting the problems of the present-day: science fiction – as a speculative form – should allow for an imagining of alternatives that are not permeated with the trappings of existing institutionalized discrimination.

The current scholarship on women in science on screen is limited but has thus far almost exclusively focussed on the role and provenance of white women. The black woman, as Doane (1991) notes, is of often ‘lost in the process’ of analysis as she is both raced and gendered – so discussions of women scientists tend to focus on the white woman in part because of the bias

that Doane identifies and moreover sadly because they are also rarely offered representation.⁵ There have been other examples of fictional black women scientists in science fiction film and TV including haematologist Dr. Karen Jenson (N’bushe Wright) in *Blade* (1998), medical doctor-in-training Martha Jones (Freema Agyeman) in *Doctor Who* (2007-2010), astronaut Molly Woods (Halle Berry) in *Extant* (2014-2015), the already mentioned tech-genius Shuri in *Black Panther*, astrophysicist Dr. Josie Radek (Tessa Thompson) in *Annihilation* (2018), and engineer Ava Hamilton (Gugu Mbatha-Raw) in *The Cloverfield Paradox* (2018). Despite these notable examples it is very ‘rare’ for black women scientists to be seen in science fiction, which makes analysis of black women scientists all the more important (Meyer 2018, np).

Star Trek idealises science and the scientist, but throughout much of its history the science future it imagines has been distinctly white, straight, and male. In *Discovery* Michael Burnham offers representation as not only a woman scientist but specifically as a black woman scientist, which makes her doubly rare in science fiction representation. Burnham notably works alongside a crew of (named) scientist characters who also further the show’s diversity including: astromycologist (study of funghi in space) Paul Stamets (Anthony Rapp) and his partner – both romantic and professional – Dr. Hugh Culber (Wilson Cruz), another person of color.⁶ Burnham is also not the only woman in the engineering lab as she appears alongside the red-headed theoretical engineer Cadet Sylvia Tilly (Mary Wiseman) working with the ship’s organic propulsion system (the spore drive) and to rescue Burnham’s adoptive Vulcan father Sarek (James Frain) with experimental neurological technology.⁷

Season two of *Discovery* sees the development of Tilly as a key woman scientist character, although Burnham remains the central character for the season and her scientific and

⁵ In Steinke and Tavarez’s 2018 study of 42 films released between 2004-2012, 72 women scientists were identified in comparison to 142 men – which is particularly striking as this was not a study of *all* science-based films from the period of study but only those specifically with women in prominent speaking roles. The ratio of almost exactly 2:1 for male/female scientist speaking roles shows that even in films with women scientists in central character roles they are still outnumbered.

⁶ Previous characters have been read as queer in the *Star Trek* franchise, but Culber and Stamets’ relationship is established and then normalized and placed in context alongside other romantic relationships within the series. For further analysis of LGBTQ representation in the *Star Trek* franchise in general and on *DSC* in particular, see Sabrina Mittermeier and Mareike Spsychala’s essay “‘Never hide who you are:’ Queer Representation and Actorism in *Star Trek Discovery*” published in this volume.

⁷ The initial reception of Cadet Tilly raised questions about whether the character was intended to be interpreted as being on the autistic spectrum – her self-definition of having ‘special needs’ is not fully explained and left to speculation. Even though Wiseman has responded to these suggestions to say that her character was not intended to be read as autistic (Hatchett, 2018), the reception of Tilly as another instance of diversity and representation in the show is worth noting as it generated discussions of representing disability. See: Teresa Jusino, ‘Did *Star Trek: Discovery* Just Introduce a Recurring Character on the Autism Spectrum?’, *The Mary Sue*, 2 Oct (2017), <<https://www.themarysue.com/cadet-sylvia-tilly-star-trek-discovery/>>, and Keisha Hatchett, ‘Is Is *Star Trek: Discovery*’s Tilly on the Autism Spectrum? [video interview with Mary Wiseman]’, *TV Guide*, 7 Feb (2018), <<https://www.tvguide.com/news/is-star-trek-discoverys-tilly-on-the-autism-spectrum/>>.

emotional intelligence continues to underpin her actions. Burnham takes on the mission of saving her brother (Spock) and investigating the mysterious actions of the Red Angel. Once the identity of the time-traveller is revealed to be Burnham's mother – Gabrielle – *Discovery*, if only briefly, gains its first black woman astrophysicist and engineer. Dr. Gabrielle Burnham's expertise allows her to escape death and travel through time to warn her daughter of the universe's impending and complete depopulation. Dr. Burnham had been developing the Red Angel suit as time-travel device for Section 31 prior to the Klingon attack where she used the suit to escape, but it later became a tool for jumping through time in attempts to prevent a newly sentient artificial intelligence (Control) from downloading the Sphere data, a key step in the destruction of all sentient beings.

The woman scientist that had been very much second to Burnham in the first season emerges as a key site of science in the second. Tilly is featured in several sequences in the first two episodes of season two, experimenting on a chunk of asteroid made of dark matter (or, as Tilly explains, 'not composed of non-baryonic matter'). The asteroid is strapped into *Discovery*'s hold with the support of a gravity simulator, but it is still volatile, as comedic scenes of Tilly working with the material attest. Tilly's tenacity sees her repeatedly return to the problem of the dark matter, its connection to the Red Angel, and how its power might be harnessed. Tilly is also frequently referred to for her expertise when on the bridge as a science officer – offering analysis of data and working with and attempting to manage and protect the Sphere data.

The encounter with the asteroid also brings Jett Reno (Tig Notaro) onto the ship – a woman engineer who survived the *USS Hiawatha*'s crash landing on an asteroid and sustained the lives of injured crew members before their rescue. Reno is introduced to the show via three drones that signal her need for help from *USS Discovery*, her characterization is founded in her problem solving and adept application of medical and engineering knowledge. Her addition to the crew adds another woman of science and also a queer woman. Reno's wife died in the Federation-Klingon War and she continues to wear her wedding ring in memoriam. Like Culber and Stamets, Reno's queerness is not hidden and more importantly is not revealed as being something that defines her as different or other – instead it is simply there.⁸ Reno and Tilly offer distinct images of women of science with their physicality suiting and amplifying

⁸ The phrasing in this sentence is purposely drawn from a discussion of the campaigns surrounding the release of *Star Trek: Voyager* from LGBTQI fans such as the 'Voyager Visibility Project' that wanted the show to include characters for whom their 'queerness is neither hidden nor revealed *as difference*, but is simply there' (Pearson, 1999, 2). The inclusion and naturalization of queer characters is still quite unusual, with few appearing without coming-out narratives fixated upon their sexuality/gender identity.

their characterisation and the message that it is competency that counts. Tilly offers a non-standard Hollywood aesthetic with an athletic rather than skinny build, and her long red curly hair, although neat in professional settings, is not as restrained as expected from fleet personnel. She has presence both physically and intellectually that is often expressed through loquacious energetic enthusiasm – but her ability is unquestioned by her peers and superiors even when her presentation is unconventional. Reno is represented as somewhat less traditionally feminine and recalls the androgyny of *Alien*'s Ellen Ripley (Sigourney Weaver). She seemingly aligns with Flicker's (2008) typology of the 'gruff woman's libber' or 'male woman', but once placed within the wider context of the *Discovery* crew it is difficult to critique Reno as such because she is not the exception to a male majority.

The women scientist stereotypes that Flicker (2008, 2003) catalogued seem to be based upon the notion of the fictional woman scientist in isolation and as anomaly. By representing women as part of a diverse working environment – here, specifically the science and engineering lab – the images of women that may have been considered limiting previously are less pronounced with women expressing themselves however they wish without fear of their appearance affecting the perception of their expertise. Reno, as a later addition to the *Discovery* crew and a humorous challenger to Stamets' sharp tongue and cantankerous demeanour, becomes part of the spectrum of the definition of who can be a scientist.

Whereas Reno is shown as a practical engineer and Tilly is identified specifically as a theoretical engineer, Burnham must take on the burden of being the impossibly polymathic woman scientist. Her focused high-level intelligence is in part attributed to her Vulcan upbringing – where she was educated to the highest standard surpassing the expectations of her adoptive family and species. But it is also due to a trend in science fiction films in which it is necessary for the woman scientist to be represented as a 'superstar' who sacrifices her femininity for science (Elena, 1997, 270). As Eva Flicker (2003, 316-317) surmises: 'The portrayal of women scientists... is orientated on their deficiency – either not a "real" woman or not a "proper" scientist – [which] contributes to the formation of myths about women scientists' lack of competence.'

Burnham must navigate this tension of not being a 'real' woman or a 'proper' scientist, alongside not being seen as entirely human (emotionally deficient) due to her Vulcan upbringing. In the time-loop episode – 'Magic to Make the Sanest Man Go Mad' (1x07) – Stamets, who knows that he is repeating the same thirty-minutes because of his genetic connection to the spore drive, needs a secret from Burnham that he can use to convince her in future loops that he is telling the truth about their predicament. Her secret is that she has never

been in love. Despite her intelligence and successes Burnham has ‘failed’ to ‘have it all’ as a professional woman and needs time to practically stand still before she can be progress into a heteronormative relationship (with Ash Tyler [Shazad Latif]).

‘Representation in [a] fictional world’ as Gerbner and Gross (1976, 182) argued ‘signifies social existence’ whereas ‘absence means symbolic annihilation.’ Women scientists and more acutely women scientists of color have been symbolically annihilated from both science fiction and the history of science. Gaye Tuchman (1979) specifically notes that in the media women are largely invisible and when they are visible they are marginalized or used as a symbolic representation of gender equality. It is not, as historian of science Patricia Fara (2008, 19) observes, that women scientists have been ‘written out’ but rather that they ‘have never been written into these stories’. *Discovery* offers representation that has previously been missing – but this means that Burnham and equally the actress Sonequa Martin-Green carries a substantial ‘burden of representation’ as she is the first woman of color and the first active woman scientist to lead a *Star Trek* franchise production (Mercer, 1990). Burnham propels the representation of women scientists forward by placing them at the center rather than the margins of someone else’s story. Any discussion of women scientists is often marred by this burden as these women (indeed both fictional and real) are not only critiqued for their scientific ability and their duty to represent and inspire their gender, but they must also be practically ‘perfect’ women (exceptionally successful as mothers, lovers, *and* scientists).

In the same way that black women are doubly underrepresented as both raced and gendered subjects, then, the burden of representation also weighs heavier upon them as they are made symbolic of two underrepresented groups and thus judged doubly as harshly as they are expected to ‘speak *for* the entire community from which they come’ because of their representational scarcity (Mercer, 1994, 214 – italics in original).

Women Scientists Practicing Science

Science and has been traditionally framed as a ‘value-neutral knowledge’ practice that is *not* associated with understanding and studies of gender (Harding, 1995, 296). But as Sandra Harding argues ‘[science and technology] are not value neutral or outside culture’ and instead ‘fully embodied’ into society (296). Harding (1991, 55) established the notion that science and technology industries have attempted to improve gender issues by *just adding women* ‘without questioning the legitimacy of science’s social hierarchy’ and thus its mirroring of discriminatory practices found therein. Attempts historically (Harding was analyzing the 1980s and 1990s) and more recently to diversify scientific cultures – both real and imagined – result

in recurrent issues that fail to address institutional and structural problems that continue to limit women's participation and representation in the sciences.

As a fictional woman in scientific research and practice, Michael Burnham can be seen to align with the existing problematic history of representation either where, as argued above, women are seemingly represented as polymathic 'super scientists' or conform to the restrictive stereotypes identified by Eva Flicker (2008, 2003). Flicker (2003, 317) argues that fictional women scientists have presented 'more of a stereotypical woman's role than the occupational role as a scientist,' which may have an impact on audience perceptions and frame these women as anomalous transgressors into the realms of science practice, which Robin Roberts (2000b, 278) identifies as 'the last [bastion] of male dominance.'⁹ Although Michael Burnham deviates from the stereotype of the white woman scientist, her scientific practice is still allied to some of the restrictive expectations of women scientists on screen. She predominately works in the biosciences and it is her empathy for and 'relationship' to/with the large alien creature 'Ripper' that begins the journey to at least partially resolving issues with controlling the spore drive.

Ripper is an alien creature that strongly resembles a real-world microscopic creature called a tardigrade that displays a genetic symbiosis with the spores (from a specific alien fungus) and thus access to the mycelial network that allows the 'giant space tardigrade' and in turn the *USS Discovery's* Displacement-Activated Spore Hub drive (spore drive/s-drive/DASH) to make expansive light-year jumps in a matter of seconds.¹⁰ As Burnham explains in 'Choose Your Pain' (1x05): 'Like its microscopic cousins on Earth, the tardigrade is able to incorporate foreign DNA into its own genome via horizontal gene transfer. When Ripper borrows DNA from the mycelium, he's granted an all-access travel pass.' Ripper is retrieved from the *USS Glenn* in 'The Butcher's Knife Cares Not for the Lamb's Cry' (1x04) after *Discovery* responds to a distress call to discover the crew dead and the ship seemingly ravaged by this unknown alien. At first misunderstood as a violent alien (hence the moniker Ripper) that needs to be tortured to be controlled, Burnham uses her knowledge of

⁹ Flicker (2003, 2008) identifies seven (the seventh was added in a 2008 chapter that revised the list) different types of fictional women scientists: the old maid; the gruff women's libber/male woman, the naïve expert; the evil vamp; the daughter or assistant; the lonely heroine; and the clever, digital beauty (added 2008). These limiting stereotypes tend to position women in relation to male scientist counterparts (mother, lover, assistant) or shame these women because of their failures to align with societal expectations concerning marriage, love, and childbearing.

¹⁰ The spore drive and the representation of the tardigrade in *Discovery* as an advanced instantaneous form of interstellar transportation has been criticised by a number of scientists including Prof. Steven Saltzberg (Professor of Biomedical Engineering, Computer Science, and Biostatistics, John Hopkins University). As Saltzberg (2017) remarks: 'using horizontally transferred DNA for space travel is so nutty, so bad, that it's not even wrong. Even if tardigrades could absorb foreign DNA (they can't), how the heck is this supposed to give them the ability to tap into the (wildly implausible) intergalactic spore network?'

xenoanthropology and biology to argue that: ‘nothing in its biology suggests it would attack, except in self-defense.’ Notably, Burnham chooses to investigate (as a scientist) rather than interrogate and dominate Ripper.

In her feminist critiques of science Evelyn Fox Keller (1987, 1985, 1982) introduced the concept of gendered science and argues that science is one of the institutions of power that feminists should want to change and that there exists a possibility ‘to make science a human, rather than masculine, project’ (Oliver, 1989, 138) – ‘a science less restrained by the impulse to dominate’ (Keller, 1982, 39). Keller intimates that throughout the history of male-directed science, the discipline has been understood as ‘the power to dominate nature’ (1987, 47). In *Discovery* Burnham is not only a raced and gendered Other, but also a scientific Other as she chooses to approach her subject as something to be empathised with rather than controlled. An approach that is not considered by her scientific colleagues and the security officer who is tasked with monitoring the mutineer. In her remark: ‘understanding how it feels was not our mission’, security officer Ellen Landry, also a woman of color,¹¹ represents a traditional approach to science and also the tension the crew of science vessel *Discovery* face as their mission of exploratory science is replaced with one of weaponization. Whereas Stamets and Burnham focus their research on progressing science, albeit with different approaches, Lorca (with Landry as his emissary) is obsessed with using their expertise to create a spore-based biological weapon.

The opening of ‘Choose You Pain’ (1x05) presents a vivid dream/nightmare sequence where Burnham sees herself taking the place and thus the pain of the tardigrade. Her sentimental connection to the creature is confirmed in a later sequence in the lab where a shot-reverse-shot between Ripper (showing his full alien body) and Burnham places the two characters in conversation, providing the audience once again with an insight into the affect the torture of Ripper has on Burnham. She is visibly emotional. This is a response that she has been taught to repress in her Vulcan upbringing but one that is shown here to give her the insight she needs to understand and then appropriately utilise the tardigrade. Burnham quite literally takes on the emotional labor of the scientific experiments – as a woman she is seen to be capable of not only understanding her subject but also accessing her emotions and empathy in order to do so. She has what Keller (1983) terms ‘a feeling for the organism’ that is

¹¹ Landry is also a further example of progressive casting, where the standard secondary white male character is instead a woman of color who aligns with previously established notions of the ‘tough woman’ (Inness, 2004). Landry transgresses traditional notions of a security officer’s gender but does so in the relatively safe/acceptable body of a ‘beautiful, slender, heterosexually desirable’ woman (3).

unfathomable to the initially emotionally deficient Stamets who has no ethical issues with exploiting rather than understanding the tardigrade.¹² Burnham pleads with her colleague to release Ripper exclaiming: ‘Making Ripper the critical component of the s-drive is unsustainable for the creature and your invention’ (1x05). The animate co-pilot suffers immeasurably each time a jump is made, a feeling that is communicated to audiences via Burnham’s own pained expressions. Once Stamets installs himself as the new co-pilot – which *is* raised as an ethical issue by First Officer Saru (Doug Jones) who remarks that ‘eugenics experiments are forbidden’ under Starfleet’s science regulations (1x05) – Ripper is released back into the void of space. Burnham corresponds once again on behalf of the tardigrade as she surmises that: ‘what makes it most happy is to be free’ (1x05). Upon Ripper’s release it is only the woman scientists who are present – Tilly and Burnham – and shown crying in response to tardigrade’s release back into the wild and in recognition of their own scientific success with the Spore Drive.

Conclusion: Normalising Women of Color/Science

Star Trek has historically given women space to be scientists, but *Discovery* goes further than previous entries into the mythos by having a black woman physicist/bioscientist protagonist. It imagines a future when neither race nor gender present a barrier. Michael Burnham is in many ways ‘groundbreaking’ as she ‘fulfils the untapped potential of her famous predecessor’ – the bridge-bound Uhura – by controlling much of the narrative of *Discovery* and driving it forward (Mafe 2018b).

The majority of science fiction, and indeed film and TV more generally, is predominately produced by white male writers and directors, which lessens the likelihood of stories being written that explore alternative perspectives. It is ‘endemic to white culture,’ as Richard Dyer (1997, 2) has stated, that whiteness, and specifically male whiteness, is normalized and naturalized. Race (non- Caucasian) and gender are used by writers and producers to define characters as Other and even anomalous – with ‘black womanhood’ historically signifying ‘an ultimate Otherness’ (Mafe 2018a, 15). Diversity needs to happen not only on screen but across the industry – diverse stories not only offer representation but an opportunity to critique the flaws in the system. For a genre immersed in futurism, science

¹² The concept of ‘a feeling for the organism’ was developed specifically in reference to Nobel Prize-winning scientist and cytogeneticist Barbara McClintock in Keller’s 1983 biography of her. McClintock discovered genetic transposition and developed theories that explained the suppression and expression of genetic information. A specialism that aligns with the genetic research involved in accessing the mycelium network and its use (although scientifically inaccurate understanding) of horizontal gene transfer.

fiction often fails women and people of color – and most definitely for those multiply marginalised at the intersections of gender, race, and sexuality.

Michael Burnham features in the first new *Star Trek* small screen fiction to appear since J.J. Abrams' reboot of the franchise beginning with *Star Trek* (Abrams, 2009).¹³ Although the representation of women scientists, and specifically the representation of women of color, is beginning to change with the emergence of greater diversity of onscreen scientists and some key examples of women who are not immediately defined by their relationship to men and the family – these women are found more frequently in small screen fictions. Although there is 'not a plethora of examples' television has allowed 'for more ambiguity regarding who is' and can be 'the hero' with more opportunities for women characters to develop (Mafe 2018a, 141, 125). Television series provide more spaces for women scientists of color and women scientists generally to exist – perhaps because of the platform's inherent opportunities for writers/producers to develop, drop, and introduce characters over a potentially long-term serial narrative. Films have extremely long production scales and are only one entity on which producers will be judged (critically and financially) – television has a different development and dissemination process where even a small but dedicated/repeat-viewing 'boutique audience' can be sufficient to make a series financially viable (Mittel, 2015, 34) – audiences that may well positively respond to the incorporation of unrepresented character types and narratives.

Series like *Orphan Black* (2013-2016), *Extant* (2014-2015), *Doctor Who* (2005-), and the *Star Trek* franchise (most recently *Discovery*) allow for women scientist characters to develop without a need to anchor them to male scientists or familial narratives, and also include characters who further diversify the representation of women. The bio-science fiction clone drama *Orphan Black* features several prominent LGBTQ characters including the women scientists Delphine Cormier (Évelyne Brochu) and her girlfriend Cosima Niehaus (Tatiana Maslany) who exclaims that her 'sexuality is not the most interesting thing about [her].' Similarly to Culber and Stamets in *Discovery*, it is their scientific acumen that defines them and their agency within the narrative and not their same-sex relationship, which is normalized rather than spectacularized. Queer scientist representation is even more limited than the representation of both men and women from racial and ethnic minorities, and the inclusion of

¹³ The *Star Trek* film reboot that Abrams inaugurated exists, narratively, in an alternative timeframe – *the Kelvin Timeline*, named for the ship destroyed in the opening scene. *Discovery* exists in the same time line as the other television series' and the films which feature characters from the *Original* and *Next Generation* series.

Culber (alongside Stamets) in *Discovery* constitutes not only the first openly gay mixed-race couple but the first gay scientist of color to feature in the *Star Trek* universe.

Improving, increasing, and diversifying media representation is only one way of affecting change, but it is an important part of long-term project to change the representation and perception of the sciences in a that way stops constraining people by their race, sexuality, ability, gender. Michael Burnham, alongside an emerging number of black women scientists in both cinematic and small screen fictions, represents an opening up of the imagined future where not only race but also gender can be found at the forefront of the discovery of worlds and cultures where no one has gone before.

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