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> As an imaginary body, the figure of the astronaut offers us the option to find new identities and transcend the dichotomies dictated by Western society. As a symbolic body, however, it reminds us of the restrictions that cultural representation always implies (Brandt n.p.).

There has been a proliferation of female astronauts in science fiction film from the 1990s to the present day, in films like *2010* (Peter Hyams, U.S., 1984), *Event Horizon* (Paul W. S. Anderson, U.S., 1997), *Mission to Mars* (Brian De Palma, U.S., 2000), *Red Planet* (Antony Hoffman, U.S., 2000), *Supernova* (Walter Hill as Thomas Lee, U.S., 2000), *Sunshine* (Danny Boyle, U.S., 2007), *Prometheus* (Ridley Scott, U.S., 2012), *Gravity* (Alfonso Cuaron, U.S., 2013), *Europa Report* (Sebastian Cordero, U.S., 2013), *The Last Days on Mars* (Ruairi Robinson, UK, 2013), *Interstellar* (Christopher Nolan, U.S., 2014), *The Martian* (Ridley Scott, U.S., 2015), *Life* (Daniel Espinosa, U.S., 2017), *Alien: Covenant* (Ridley Scott, U.S., 2017), and *The Cloverfield Paradox* (Julius Onah, U.S., 2018). This on-screen proliferation reflects real world increases in the numbers of female NASA astronauts selected for the U.S. Space Programme since they were first accepted in 1978. In this way, science fiction cinema continues its tradition of reflecting on and extending the possibilities for working environments through cinematic presents and futures. From the 1990s onwards, in science fiction films set at the most proximate frontiers of space exploration — that is, in the 'present' or the near future — female screen astronauts increasingly assume positions of authority and expertise. As mission specialists, scientists, technicians or commanders, these women occupy film worlds that seem progressive in their approach to gender equality in the workplace.

Yet cinematic representation is more than its setting, and the female with professional status in science fiction has long been a site for the negotiation of gender-based behavioural norms and anxieties. Across a thirty-year period marked by culture wars about gender, reproductive

rights, the popularisation of queer and feminist deconstructions of gender, and current debates about gender variability and non-conformity, these female screen astronauts look strikingly alike. They sport a boyish appearance the homogeneity of which is at odds with real world female astronauts' diversity of visual appearance and gender presentation, and also at odds with the relative variety of 'looks' displayed by women characters in ensemble or women-in-the-workplace films in other genres in this period, which more directly reflected shifts in fashion, gender presentation, and characterisation over time, albeit usually within the confines of heteronormativity. They are also at a distance from the action-heroine-led science fiction-fantasy hybrids that emerge in the 1990s and onwards (Cornea 160-67), since their endeavours are not forged in violence or expansive physical action, nor does their consistently boyish appearance correspond to the variety of depictions of action women in films like *Hardware* (Richard Stanley, U.S., 1990), *Terminator 2: Judgment Day* (James Cameron, U.S., 1991), *The Fifth Element* (Luc Besson, U.S., 1997), *The Matrix* (Wachowski siblings, U.S., 1999), nor in later Marvel and DC fantasy films. In contrast, this strand of technologically realist astronaut-focused science fiction is unusual in offering just one type of visual look for its female protagonists over a thirty-year period. This article will explore what is at stake in this fictional homogeneity, and will consider to what extent these boyish space women might represent a progressive diversification of normative gender presentation in realist science fiction, or instead reveal the persistence of normative notions of gender in these apparently gender-neutral cinematic spaces. Drawing on a combination of close textual analysis and feminist science fiction scholarship, this essay will investigate how issues of gender continue to structure these recent science fiction films and their inflections of traditional ideas about space travel.

Recent screen female astronauts can be seen as successors of the female scientists and technologists of 1950s speculative science fiction, who combined a conventionally feminine gender presentation with professional expertise, thus dramatising both the anxieties and possibilities generated by the postwar entry of women into the science workforce (Noonan

2005). In films like *It Came from Beneath the Sea* (Robert Gordon, U.S., 1955), *Them!* (Gordon Douglas, U.S., 1954), *Tarantula* (Jack Arnold, U.S., 1955), and *Beginning of the End* (Bert I. Gordon, U.S., 1957), female scientists are permitted to shape aspects of the narrative using their scientific or professional knowledge. Yet they are also embedded in a patriarchal structure, usually situated 'between an older and a younger male,' the older man a professional mentor figure, the younger a romantic prospect (Noonan 'Women Scientists' 103). The mentor 'permits' the presence of the woman in the scientific or professional workplace, signalling the extent to which this was, in the 1950s, still a culturally uncomfortable development. As Noonan shows, by the end of these narratives the female scientist's professional agency is often curtailed, and she is most frequently contained within a heterosexual union or its prospect. In her subsequent survey of 1960s and '70s science fiction ('Gender'), Noonan notes that a woman's 'significant presence in either the military or the laboratory' is no longer depicted 'as anomalous.' Nevertheless, in most cases a 'romantic attachment to a male automatically supersedes her commitment to, even interest in, a career' (Noonan 'Gender' 27-8).

Given this earlier history, to what extent does the female screen astronaut of the 1990s and 2000s remain caught in the patriarchal logic of these earlier representations of professional and science women? In the real world in this period, women were being routinely accepted onto astronaut training programmes and travelling into space. Indeed, they had been considered for space from the late 1960s, when NASA began its plans for Space Shuttles and Space Stations. These planned developments would allow larger groups to travel into space, and thus 'make space' for people other than white men in space exploration, including non-military trained scientist-astronauts, or 'Mission Specialists' (Foster, 67-86). The 1972 Equal Employment Opportunity Act offered a further impetus, and women and African Americans were accepted into the NASA astronaut training programme from 1978[1] (Foster 89, 153), shifting public perception of what an astronaut could be away from the longstanding figure of the white, cis-gendered military-trained male. Thereafter women from a variety of

educational, economic and ethnic backgrounds, and displaying a range of different styles of gender presentation, have trained and gone into space (Hersch 88).[2] They have been astronauts, mission specialists, Shuttle pilots and Space Station commanders. Some caveats are worth highlighting, however. Female pilots and commanders have been very few in number (Foster 155), and women are still subject to media attention overly structured by normative notions of gendered behaviour; Sally Ride, the first American woman in space, was asked if she would cry during the flight (Ride in Cavallaro 22), while the media anxiety about the appropriateness of astronauts who are also mothers travelling into space is persistent, as Bronwyn Lovell notes elsewhere in this special issue. So how has this routine inclusion of women been handled in science fiction film?

The female screen astronaut displays a consistency of key characteristics across the films in question. She is socially independent, mentally and physically robust, and often – if not always – occupies an important place in the command hierarchy, or in the team of scientific specialists. Her presence is not questioned by male colleagues, and she displays narrative agency, able to act to ensure the survival of herself and others while being a key witness to the mysteries and dangers of space. She thus reflects and extends a real world context in which women have been shown to be capable of and competent at space travel, her mental and physical resilience taken for granted rather than overtly proposed as anomalous, itself reflective of a more expanded public understanding of what is understood to 'make an astronaut.' Yet her striking homogeneity of visual appearance across three decades of space-set films might imply a different perspective. The female screen astronaut repeatedly sports a close-cropped 'boyish' hairstyle, or, if she has long hair, will pull this tightly back from the face to create the impression of a close-cropped style. Examples include Terri Fisher (Connie Neilsen) and Reneé Coté (Jill Teed) in *Mission to Mars*, Dr Kaela Evers (Angela Bassett) and Danika Lund (Robin Tunney) in *Supernova*, Ryan Stone (Sandra Bullock) in *Gravity*, Rosa Dasque (Anamaria Marinca) in *Europa Report*, Kim Aldrich (Olivia Williams) in *The Last Days on Mars*, Dr Amelia Brand (Anne Hathaway) in *Interstellar*, Ekaterina Golovkina (Olga

Dihovichnaya) and Miranda North (Rebecca Ferguson) in *Life*. Where the 1950s female scientist and her 1960s and '70s successors were for the most part depicted as conventionally feminine in hairstyle and clothing choices, the 1990s-and-onwards female screen astronaut adopts a short hairstyle more traditionally associated with normatively male gender presentation.

Yet the films are not interested in coding these women as lesbian, for example, which is one of the ways in which masculine markers such as short hair have been deployed in cinema. Like in the 1950s science fiction films, in almost every one of these more recent space exploration films the female astronaut is overtly embedded within a heterosexual field of human interaction. In *Mission to Mars* Terri Fisher (Nielsen) is defined by her marriage to Blake (Tim Robbins): she travels into space with him, and returns the grieving wife. The only surviving male astronaut in *Red Planet* is the one with whom Commander Bowman (Carrie-Ann Moss) had already begun to develop a romantic relationship. This imperative seems less insistent in some later films: in *Europa Report*, for example, Rosa is not shown to have a family or partner to call home to (when asked about this by a crew mate she tells them to mind their own business); in *Life* both female astronauts seem relatively unencumbered by Earth-based family. Yet elsewhere it resurfaces. Brand in *Interstellar* makes key decisions about which planet to explore based on the fact that the male astronaut she loves is on one of them (she must be argued out of this position by the supposedly more 'rational' Cooper (Matthew McConaughey), whose desire to get home to his daughter drives the whole narrative). At the end of *The Martian* we see the film's two female astronauts in heteronormative settings as they watch the next Mars mission depart Earth without them: Commander Lewis (Jessica Chastain), responsible for rescuing the stranded Mark Watney (Matt Damon), is at home with her husband, while Johanssen (Kate Mara) is in hospital with her boyfriend having just given birth to their child. This tendency to manoeuvre female protagonists into a heterosexual romantic relation is symptomatic of the way in which mainstream narrative cinema has traditionally depicted women, but it seems at odds with the

decision to visually represent the female astronaut as consistently boyish.

Despite the fact that the female screen astronaut's presence is naturalised within the fictional workplace setting through her status and the respectful interactions from other colleagues, this insistence on assigning of a mark of normative masculinity (short hair or its visual impression) to the woman astronaut may reveal a desire in the filmmakers to signal her as an anomalous presence. Certainly, this mark calls up the figure of the tomboy, a young girl who adopts some visual aspects of normative masculinity in order to take up the opportunities for exploration that only seem available to boys. Historically tomboyism has been tolerated in young girls exploring a '"natural" desire for the greater freedoms and mobilities enjoyed by boys,' but, as Jack Halberstam points out, it has been punished if it 'threatens to extend beyond childhood,' when it might indicate a wilful refusal of heteronormativity and the gendered binary of passive and active agency it secures (5, 6). Tomboyism is a mode of gendered self-expression for young women, then, but it can also be a designation made by those who see impulses towards exploration and physical assertion as beyond the behavioural norms of women, rather than being open to expanding the category of woman to accommodate such impulses. In this context, it may be significant that all the films discussed here are made by male directors. Certainly, visually associating these adult screen astronauts with the figure of the tomboy rhetorically positions participation in space exploration as more usually a male endeavour. Even as their screen colleagues treat them as unsurprising equals, these female astronauts are visually framed as out of the ordinary, implying an underlying association of the world of space technology with masculinity.

This association also emerges in the representation of the female screen astronaut in close-up. Here too, a consistency of approach is legible that is striking across such an extended period, and is similarly gendered in the iconographies of facial representation that it draws upon. The close-up is an established technique in cinema to register characters' responses to peaks of narrative intensity, so it is not surprising that the close-up is used in these space-set films to

capture the female astronaut at moments of crisis, stoicism or exertion. The close-up is also a traditional method of displaying the star of a film, deploying a three point lighting system to light the face (using the 'key light'), eliminate shadows (the 'fill light'), and separate her from her surroundings (the 'back light'). Such lighting strategies have historically been emphatically gendered and racialised, as Richard Dyer has noted. 'Idealised white women are bathed in and permeated by light… the use of haloes, backlighting, soft focus, gauzes, retouching and all the other conventions of feminine lighting' eliminate the 'ethnically loaded evils of shadow and shine,' and soften the face of the female star (Dyer 122, 125). In contrast, the white male hero is 'portrayed with greater contrasts of light and dark, hard contours but areas of translucence' (113). Close-ups have become much more common in recent decades (Bordwell 130), which has led to some diversification away from these fixedly gendered approaches. However, what is notable in the female screen astronaut films is that the close-up of the woman protagonist eschews such diversification, but not in the service of preserving the historical 'glamour' approach associated with the female star. Instead, the female astronaut's close-ups in these films consistently adopt the lighting strategy Dyer identifies with the male star. The cropped short hair (or hair pulled tightly back from the face) allows the jaw line to be visible from ear to chin, while side lighting works to mark out the structure of the face and harden the line of the jaw, creating an impression of facial angularity.

Let's look at an example. In *Red Planet*, Commander Bowman, played by Carrie-Anne Moss, leads a crew of male astronauts on a mission to explore what has gone wrong with the atmosphere-building project that would make possible the human colonisation of Mars. After their spacecraft is damaged Bowman stays behind to 'secure the ship' while the male astronauts head to the planet surface. As the team on the ground run into a number of further problems, from communications blackouts to a malfunctioning military robot to flesh-eating Martian insects, Bowman monitors their progress and issues commands and instructions, unflappable and resourceful in the face of the crew's evolving predicament. Throughout the film, Bowman is most frequently framed in close-up shots that foreground her focus and

resolve. She is often framed at an angle so that she is looking off screen in profile, revealing her jaw line as it extends back from the chin. The key light mimics the illumination and directionality of the displays she is perusing, and the fill light is usually set at a very low level, delineating her cheekbone and jaw bone through areas of relatively hard contrast shadow. Two back lights are often used, one lightly picking out the top of the head, and one picking out the contours of the neck line and the corner line of the jaw, as in figure 1. Bowman's jaw line is persistently emphasised through lighting, framing and blocking. This is, notably, in direct opposition to how the male crewmembers are lit and framed; close-ups of the male crewmembers adopt a softer, less contrasting lighting strategy. In the daytime scenes the fill light is set at a higher level to de-emphasise the shape of the men's jaws; in the night-time scenes their jaw lines tend to disappear into shadow. The comparative treatment of male and female jaw lines here works to reinforce the film's narrative. The male astronauts in *Red Planet* are a fractious group, shown variously bickering, fighting, and succumbing to the dangers posed by Mars and each other. It is Bowman who successfully 'squares up' to the challenges of space, corralling the men, and ultimately succeeding in saving the remaining crewmember. The lighting pattern described which accompanies these close-ups that affirm Bowman's fortitude — illuminating the line of the female astronaut's jaw while throwing her male colleagues' jaw lines into shadow — is strikingly common in the films under discussion. In films such as *Red Planet*, *Supernova*, *Prometheus* (Ridley Scott, U.S., 2012), *The Martian*, and *Life* the female commander or female superior is framed and lit by the high contrast jaw-focused close-up described above, while male crew members are usually lit in a softer, less angular manner (see figure 2).

Figure 1: Bowman (Carrie-Ann Moss) monitors her crew's situation in *Red Planet*

Figure 2: Shaw (Noomi Rapace) and Holloway (Logan Marshall-Green) debate each other in *Prometheus*

Red Planet communicates and consolidates the audience's sense of Bowman's capacity for heroic resolve through the close-up and its highlighting of the character's setting of her angular jaw: the closing of the mouth, the pressing together of the teeth and the clenching of the lower facial muscles so that they become more rigid, and thus appear more impenetrable. Such close-up shots invoke what Laura Marks calls a 'sense memory' (110), that of setting the jaw in grim determination in the face of a threatening prospect. They also call up a long tradition in American culture of associating the square male jaw with connotations of strength, resilience, and determination, in both military contexts and in cultural representation more broadly. Military drills designed to display the collective strength of an army or regiment hold the head erect and straight to produce a configuration of seemingly impenetrable straight lines in the angle of chin, jaw and neck. The phrase 'stiff upper lip' originates in part from American military marching songs of the nineteenth century (Dixon n.p.), which associated a rigidity of facial structure with sang-froid and stoicism. The square jaw is also prominent in action cinema history, from swashbucklers and gangster films to peplum films to the 1980s 'hardbody' film. In each case the close-up of the male hero tends to frame the face at an angle, allowing the robust line of the jaw to be foregrounded through high contrast lighting and often the addition of a beard or so-called 'five o'clock shadow' (for example in *The Adventures of Robin Hood* (Michael Curtiz, William Keighley, U.S., 1938), Hercules (Pietro Francisci, U.S., 1958), or First Blood (Ted Kotcheff, U.S., 1982)). Officer Ellen Ripley (Sigourney Weaver) in *Aliens* (U.S., 1986), along with the transformed Sarah Connor (Linda Hamilton) in *Terminator 2* (James Cameron, U.S., 1991), would take up this square-jawed resilience in their overt co-option of the masculinist iconography of the action genre.

While the female astronaut film does not, on the whole, embrace the action film's hyperbolic masculinist iconography, it is clear that the square jaw in and of itself remains an important signifier of strength. The archetype of the strong female astronaut was forged in the depiction

of Officer Ellen Ripley, who surprised audiences by surviving to the end of *Alien* (Ridley Scott, U.S., 1979), and went on to become a feminist icon in her embodiment of a heroic, active agency in the sequels. Bonnie Noonan points out the debt Ripley owes to 1950s female screen scientists:

> Sigourney Weaver's Ripley resuscitated the trope of the commanding (and of course attractive) woman scientist/adventurer of the Fifties films. In Ripley we see reverberations of Dr Lesley Joyce, who gave orders to the military in *It Came from Beneath the Sea*; Dr. Iris Ryan, who dodged a flesh-eating infection in space in *The Angry Red Planet*; mathematician Sally Caldwell, whose orthographic projections and Earth curvature calibration work helped track a menacing flying creature in *The Giant Claw*; and Dr. Patricia "Pat" Medford, who gave the order to destroy a coven of gigantic mutated ants ("Burn it. I said, burn it!") in *Them!* (Noonan 'Women Scientists' 154-5).

Cast in *Alien* in one of two roles that were written for either a man or a woman, Weaver was a relatively unknown actress, but was selected, according to producer David Giler, due to

> her physical presence. She's tall and kind of commanding and she has a sort of American aristocratic bearing and that you believed her as an officer and that she was physical... We thought [she] could bring something of the kind of leading man quality to this part, which is what it needed.'[3]

Giler doesn't mention bone structure specifically, but in his invocation of an officer class of military rank and the physicality of the leading man, it is clear that he saw in Weaver a physical manifestation of the square-jawed American hero. Male filmmakers who have since sought to depict female protagonists who are credibly up to the challenge of navigating the dangers and stresses of space exploration have defaulted to this jaw-focused close-up, usually more characteristic of the framing and lighting of the male hero, to visually express these women's resilience.

This reliance on signifiers more commonly associated with the male hero (the boyish look,

the square jaw) may evidence an inability on the part of filmmakers to think outside the binary norms of gendered behaviour. The logic of their thinking (or subconscious assumptions) might be speculatively summarized thus: women able to subject themselves to the rigours of space exploration are anomalous when compared to conventional gendered expectations of what women can 'cope with' and what spaces they should 'normally' occupy, and thus are required to be marked with signs of masculinity that can invoke the gender more traditionally associated with strength, action and exploration. While women from all over the world have been travelling into space as pilots and mission specialists for many years now — and cinema is happy to acknowledge this by incorporating female astronauts into its narratives — it is clear that within the detail of these depictions lies a tension between normalising their presence in space and signalling them as exceptional in comparison with other women who are not space explorers. Yet the repetition of this trope of the square-jawed female astronaut establishes associations between robust female facial structures and the technological structures within which these women have to work and survive that can exceed the reference back to an historical notion of masculine strength.

Béla Balázs privileged the close-up as part of his wider claim for cinema as an expressive art. He describes its power thus:

> If we see a face isolated and enlarged, we lose our awareness of space, or of the immediate surroundings… Confronted by a face, we no longer find ourselves within a space at all. A new dimension opens before our eyes: physiognomy. (276)

This resonant description conveys the affective charge of the close-up, which for Balázs is rooted in form — in the bone and muscle structures of the face and the way the skin clothes them. Balázs is so taken with the compelling nature of the face itself that he minimises the connotative importance of the setting which might frame that face, and the relationship between the face and the setting. As Mary Ann Doane points out, Balázs' idea of the close-up freed from its immediate surroundings better describes the memory of a close-up than its experience within the flow of narrative cinema ('The Close-Up' 90-91). Close-ups exist in

context, and in the many close-ups of female astronauts offered in the films under discussion, the face is placed in context even at this close shot scale. Medium close-ups rather than extreme close-ups are most common, so that the technologised environment around the female astronaut is (almost) always shown. For example, in the medium close-up in figure 1, the instrumentation panels and control lights are clearly visible around Bowman. The fact of her constant vigilant monitoring of the crew's situation, and her attempts to resolve their difficulties from a distance, are encapsulated in these close-ups precisely through the juxtaposition of her face and her proximate environment. The female astronaut's face is always embedded in her immediate, technologised surroundings, most frequently the space ship interior. Yet Balázs's conception of physiognomy is still of some use in thinking through this relationship between face and environment and the meanings it can generate.

Balázs most often associates the term physiognomy with the facial revelation of emotions, but, in arguing that close-ups are inherently anthropomorphising, he also suggests that inanimate objects, buildings, and landscapes have a physiognomy that can be read. What is implicit here is the sense that faces, buildings, landscapes, and objects share a form, a structure, a 'thingness' that gives them a face, a façade, a surface that can turn towards us. Steel, bricks and mortar, in the case of a building, for example; bone, muscle and skin in the case of a face. Balázs comments, 'Every child knows that things have a face…' (46), but it is equally true that faces have a thing-ness, a material presence and shape, a co-location of surface and underlying structure, that opens up the face's metonymic potential. The close-up of the female screen astronaut foregrounds the facial aspects that connote strength and resilience; the clearly delineated square jaw, the robust and angular bone structure, the muscles that set the jaw immovably in place. Here the 'thingness' of the face carries connotations of rigidity, of impenetrability, that correspond to and are reinforced by the 'thingness' of the facades that surround that face — the engineered solidity of the structures in which these astronauts operate. In this way the repetition of this type of facial close-up, in which biological and technological structures mirror each other in their rigidity and solidity,

invests the female astronaut with an impression of strength that sits apart from a gendered iconography of resilience.

However, the 'thingness' of this square-jawed resilient face can also call up opposing connotations that sometimes return us to normative conceptions of gender. Space-set science fiction cinema harbours inherently conservative and anthropocentric fears: human life must be contained, sealed and protected from hostile environments and the aggressors that might populate them; technological structures make this possible, but can fail. The square jaw in close-up produces heightened awareness of both solid bone and soft skin, mobilising intersecting connotations of resistance and 'give,' strength and vulnerability that analogise the character's relation to the life-permitting membranes and structures that constitute their wider environment, from heat resistant outer shields, to metal cross-bracings, to buttressed cargo-padded walls, to the airlocks and laboratory containment units that female astronauts are so often trying to protect from alien incursion. Such shots participate in what Sarah Ahmed and Jackie Stacey have called the 'fetishising of the skin as boundary-object' (3), sustaining normative conceptions of inside and outside, surface and depth, mind and body, self and other. Like science fiction cinema more broadly, many of the films under discussion thematise the policing of borders, and the utopian or dystopian possibilities that open up when those borders are breached (Telotte 197).

It is no coincidence that the square-jawed female astronauts of science fiction cinema so often occupy boundary-policing roles. In *Alien* it is Ripley who fights to maintain quarantine when Captain Dallas (Tom Skerritt) instead wants to bring on board the infected Kane (John Hurt). In *Life*, it is only Commander Ekaterina Golovkina (Dihovichnaya) and Dr. Miranda North (Ferguson), of the Centers for Disease Control and Prevention, who have full knowledge of the firewall protocols in place to protect Earth from the Mars-born organism being studied at the International Space Station. A two-shot repeated twice in the film shows North and Golovkina in profile in close-up, their faces lit by a strong frontal key light that throws half of

their faces into shadow, while their jawlines are picked out by a green back light (see figure 3). Both share firewall maintenance responsibilities; both will sacrifice themselves in different ways in the narrative, in attempts to keep the firewall intact. In these shots their faces, turned towards the Martian organism, become resisting facades, a visual prefiguration of the work they will do to try to stop the breaching threat. In *Europa Report* it is the boyish-looking last surviving member of the mission to Mars, Rosa Dasque (Marinca), that decides to allow an antagonistic water-born cephalopod into the landing craft, killing herself in the process, so that others will be able to study video footage of the creature from a safe distance.

Figure 3: Dr North (screen left) and Commander Golovkina watch the Martian organism from behind a soon-to-be-breached firewall in *Life*.

The resolve of the female astronaut at these junctures between safety and breach, life and death, signalled not just by her actions, but by close-ups in which her jaw is set in the moment of decision and in her recognition of that decision's implications, is worthy of celebration. It interrupts at a basic level the old cultural association of woman with passivity, and does so persistently and often compellingly across thirty years of screen depictions of female astronauts. Yet these repeated tropes of boundary crossing contain female astronauts in technologised environments that are compartmentalised but under threat from repeated penetration with often life-threatening or life-changing consequences, a move which is itself normatively gendered. Sometimes antagonistic extra-terrestrials perpetrate the penetration of these conjoined, life-enabling spaces, in the process reproducing themselves in proliferating and fatal ways (such as in *Life*, or *Supernova*). Sometimes it is the astronauts themselves that must penetrate new spaces in order to be borne anew (a much discussed scene in *Gravity* for example shows Dr. Stone (Sandra Bullock) curling into a foetal position in the hard-won but temporary safety of the International Space Station air lock, as she mentally seeks to negotiate the transition from losing her fellow survivor-collaborator Kowalski (George Clooney) to

having to push through on her own. In its repeated emphasis on architectural analogies for penetration, conception and rebirth, the female astronaut film represents a hyperbolic continuation of science fiction's 'fairly insistent history,' as Mary Ann Doane puts it, 'of representations of technology that work to fortify – sometimes desperately – conventional understandings of the feminine' (Doane 'Technophilia' 182). Doane traces a history that runs from the duplicitous temptress machine-woman of films like *Metropolis* (Fritz Lang, Germany, 1927), which perpetuates the virgin/whore dichotomy that is well established in Western cultural traditions, to films like *Alien*, *Aliens* (James Cameron, U.S., 1986) and *Blade Runner* (Ridley Scott, U.S., 1982), that 'elaborate symbolic systems that correspond to a contemporary crisis in the realm of reproduction' precipitated by the arrival of reproductive technologies like In-Vitro Fertilisation and surrogacy (185).[5] *Alien* is emblematic of a post-1970s trend in which 'the category of the maternal' assumes 'monstrous proportions' (ibid): characters must witness, resist or endure multiple impregnations, mergings with and birthings of the alien other. It is also illustrative of the ways in which such anxieties can work to structure the environments of these films:

> The ship itself, the Nostromo, seems to mimic in the construction of its internal spaces the interior of the material body… The female merges with the environment and the mother-machine becomes mise-en-scène, the space within which the story plays itself out (185-6).

The female astronaut films that have followed *Alien* repeat its originary act – designating a woman as the most resilient witness and protector, so that her biological capacity (in depressingly tenacious normative cultural discourse) for being penetrated and for producing and protecting life is caught in an over-determined visual correlation with both the narrative trajectory of these films and the technologised spaces in which they place her. While all of the *Alien* films are preoccupied with this reproductive iconography, the extent of the female astronaut's agency shifts between the earlier *Alien* films (what is often called the '*Alien* Quadrilogy' and includes, alongside *Alien* and *Aliens*, *Alien3* (David Fincher, U.S., 1992) and

Alien: Resurrection (Jean-Pierre Jeunet, U.S., 1997)) and the prequels, *Prometheus* and *Alien: Covenant* is worth noting. In the earlier films, the protagonist, Ripley, is the epitome of heroic agency; even as she is forced to repeatedly experience the threat of penetration by the alien other (even after she has been breached, she survives (in a manner of speaking) to experience this threat anew in *Alien: Resurrection*) her character's narrative and representational centrality — her survival as a subject — is sustained. The prequels in contrast offer female astronauts who are equally forceful in their heroic attempts to protect themselves and others, but with radically curtailed character lifespans. In each film, a female astronaut takes up the mantle of the resilient witness and protector; in *Prometheus* this is Shaw (Noomi Rapace), who is impregnated with an alien and must self-administer abdominal surgery to remove it; in *Alien: Covenant* which is set ten years later we discover that Shaw has not survived, and her dissected corpse is enabling new alien organisms to be bred. *Alien: Covenant* ends with its own resilient female survivor, Daniels (Katherine Waterston), faced with the same prospect: impregnation and death. In a sense, this is simply a result of managing a franchise's narrative timelines (and the casting problems that can go with this, from film to film), but it is also symptomatic of a wider trend. As Dean Conrad rather drily points out, while science fiction women's 'professional status may have improved' compared to earlier eras, 'narrative function has continued to decline' (93).

That such films vibrate between two poles of narrative possibility – between penetration and resistance, breach and its prevention – reveals the extent to which they continue to be haunted by the traditional association of the binary male/female with the binary active/passive, and the extent to which the figure of the female astronaut herself troubles these binaries. The strength of these female astronauts, captured in close-up, is frequently mental rather than physical, a stoic bearing-witness to the trials of other humans, watching, instructing, and waiting. As mentioned earlier, Commander Bowman in *Red Planet* stays with the ship for the whole film (she even tells the male astronaut who takes over command of the ground mission, 'I hope you enjoy the saddle'). Commander Lewis spends much of her time in *The Martian* waiting to

return to Mars for the rescue of Watney. In *Interstellar* Brand ends the film consigning herself to a years-long wait for other colonists on a deserted but habitable planet. Here the stillness of the face in close-up, in introspection, in its watching and waiting, embodies the passivity, the narrative inertia, of the female astronaut herself. Yet the act of watching also conveys the power of knowledge on the female astronaut; she documents and information-gathers, assesses and analyses, and as a result makes fully informed pragmatic decisions, some of which are emphatically marked by the traditionally physical competencies and bravery of the male hero. So inertia can engender empowered action. The 'tether rescues' that occur in *Red Planet* and *The Martian* (as well as the failed tether rescue in *Mission to Mars*) are good examples of this shift into physical action. At the climax of *Red Planet*, Bowman rescues the last surviving member of the crew, Gallagher (Val Kilmer), by launching herself out to catch him in mid-space, after he blasts himself off into Mars orbit in a projectile improvised from an old Russian rock probe. Her extensive observations allow her to correctly calculation the rendezvous point and method. Tethered to the ship, she is able to pull Gallagher back to safety. In a remarkably similar move, at the end of *The Martian* the stranded Watney has managed to launch himself into space in a repurposed Mars Ascent Vehicle. Commander Lewis makes a series of creative strategic manoeuvres to reach Watney, including shifting her ship's position (using up fuel in the process), ordering an explosion to decompress the internal atmosphere and thus move the ship closer to Watney, and finally launching herself in a tethered Manned Manoeuvring Unit into space to reach him. Watney has to puncture his own suit to move himself into her range, but in all other respects it is Lewis's strategic acumen and physical bravery that recovers Watney in the final stage of his departure from the surface of Mars.

The close-up itself can also provide a platform for the female astronaut's strength and resilience to be spectacularly redoubled in ways that can challenge her narrative containment. Most close-ups in the female astronaut film capture these women at moments of analysis, observation or contemplation, but occasionally emphatic exertion is the focus instead. Shaw,

the female astronaut of *Prometheus*, for example, will have her narrative trajectory curtailed by *Alien: Covenant*, but within *Prometheus* itself close-ups map the moments of extreme physical endurance and exertion that enable her survival instinct to prevail for at least the length of the film. When Shaw must drag herself onto an automated surgery table to abort the alien foetus that is already threatening to burst from her stomach, close-ups mark her painful efforts, but also the 'thingness' of her own embodied resistance. The first close-up of the sequence captures Shaw wrestling with the surgery table controls: gritting through the severe pain of the contractions, each time she selects an option from the menu on the table interface, her sweat drenched profile of nose, clenched teeth and jaw emphasises the choice by nodding vociferously towards the bottom of the frame. After some mid-shots of her pulling off her robe in preparation for the operation, the next close-up shows Shaw steeling herself against the painkiller shot and the contractions that are now causing her significant difficulty. Here and in later close-ups as the procedure gets underway, Shaw throws her head back and pushes her chin up, an emphatic and fully physicalised display of resistance to what is happening to her body and a refusal to succumb to the pain, emblematised not just by the line of the jaw, traced by a side light and corresponding shadow, but the jaw's pushing back and muscular hardening in the frame (see figure 4). These close-ups of exertion in motion exemplify the more embodied forms of strength and resistance that are sometimes required in the female astronaut film to secure the female protagonist's survival, framing the jaw line from a low angle, and using side lighting to create shadows that delineate the head and neck and their tensioned relation to one another. Culminating in and mapping physically exertive forms of assertion, such close-ups fulfil the promise that the square jaw — that symbol of male heroism, action and exploration — avers, locating the potentiality for physical assertion emphatically in the body of the female astronaut, and securing her survival often to the exception of the male astronauts that travel with her.

Figure 4: Shaw steels herself against the pain during the operation in *Prometheus*

This combination of watching, waiting, and then emphatically acting connects the female screen astronaut to the figure of the 'Final Girl' that Carol Clover identifies as key to the slasher genre of the 1970s and '80s. The Final Girl is the archetypal survivor figure of the slasher films, her resilience unending as others fall away: 'She alone looks death in the face, but she alone also finds the strength either to stay the killer long enough to be rescued (ending A) or to kill him herself (ending B)' (Clover 35). As the 'female victim-hero' (43) she troubles the traditional and gendered distinctions between passivity and activity. She witnesses the many death of her friends, before becoming angry enough to physically fight back. She shares many attributes with the female screen astronaut, being 'intelligent, watchful, levelheaded' (44). She is 'boyish' (40), with an androgynous name and a practical competence that sets her apart from her more conventionally feminine peers; the square-jawed female astronaut is equally boyish, with the surnames-only workplace etiquette conferring on her androgynous monikers like 'Ripley,' 'Bowman,' or 'Lewis.' The climax of the slasher film focuses on the Final Girl's fight back, and in the same way the climactic scenes of *Europa Report*, *Red Planet*, *The Martian* and the films in the *Alien* series focus on the physical heroism of their female astronaut characters. Clover notes that through the Final Girl and the feminised male foe she often literally penetrates, the slasher film offers up 'a world in which male and female are at desperate odds but in which, at the same time, masculinity and femininity are more states of mind than body' (22). Heroic attributes are freed from their conventional gendering sufficiently so that the female protagonist can take them up, and male viewers (to follow Clover's discussion of identification) are able to identify with the female hero.

Clover sees this fluidity in the assignment of gender attributes and identifications in the slasher film as a positive sign that, at least in some areas of popular cinema in the 1970s and '80s, certain forms of heroism were being prised away from their conventional gendering (60). But she also notes how far it is indebted to the cultural anxieties around gender that had been generated in the decade leading up to the cycle's emergence: 'that the women's

movement, the entry of women into the workplace, and the rise of divorce and woman-headed families would yield massive gender confusion in the next generation' (62). If the Final Girl persists in the female astronaut film, she does so in a very different cultural context. By the 1990s, not only were women fully established in real world workforces, female astronauts were an established presence in real world space programmes. As a result, it is difficult at first glance to conceive of the present or near-future fictional narratives of space travel as providing a similarly fraught space of gendered contention as that presented by the slasher movie's overt antagonistic environment. However, when one takes into account the extent and persistence of the masculinist rhetoric which has characterised cultural discourse around space travel and space exploration from the 1960s to the present day (which Lorrie Palmer makes clear in her essay in this journal issue), alongside ongoing wider debates about the acceptable extent of womens' penetration into the hierarchies of power (stories of glass ceilings, glass cliffs, gender pay gaps, misogyny and so on) which retain their vociferous energy today, it becomes easier to understand why, for some filmmakers, the female astronaut is a figure whose presence seems to demands careful negotiation. The female screen astronaut represents a disruption of that masculinist narrative of space exploration, even as her presence may be naturalised within the diegesis. The Final Girl archetype offers a way to manage this 'problem,' a way to combine the female with the conventionally masculine attributes she 'needs' to operate and survive in an extreme environment. On the one hand, the female astronaut as Final Girl can embody an impressive capacity for physical action that can exceed the bounds of traditional narrative containment and expand the confines of cultural representations of women. On the other hand, the fact that filmmakers working in the 1990s and beyond again and again fall back on elements of this archetype to achieve the representation of an heroic woman shows how little progress has been made in gendered representation since the 1970s, or indeed since the scientist women of 1950s science fiction.

It is clear that the figure of the female astronaut has become a site of potentiality in these recent and not so recent realist space exploration films, but that a key way in which this

potentiality is expressed is through the co-option of an icon of robustly traditional masculinity - the square jaw of the Western cowboy, the military soldier, and the rugged explorer. This means that the female astronaut does not quite yet 'transcend the dichotomies dictated by Western society' (Brandt n.p.); the gender binary persists even as she takes up empowering attributes of strength and resilience, underscored by the extent to which she is most frequently embedded in an environment for space exploration that may be highly technologised, but is also replete with spatial metaphors for reproduction. Moreover, she is most often returned, by the end of the narrative, to a heteronormative context. Yet the female astronaut film also functions as a space in which women can be resisting and self-directed, as well as physically assertive, embodying strength through the muscular resistance of their own bodies, a strength captured in the extent of their narrative agency, as well as in the close-up of physical empowerment. In this way such images of strength can exceed the narrative frame, and even the sanitised and scripted media representations of real-world female astronauts by organisations like NASA. If the 1990s-onwards female astronaut film struggles to break free of the gender binary, unexpectedly proximate to decades-old iterations of the professional woman of science, it also aspires to a future in which the female astronaut is no longer an anomaly.[4]

Notes

[1] Despite this, the first African American female astronaut, Mae Jemison, would not be accepted into training until 1987.

[2] Aside from the NASA History Program Office website <https://history.nasa.gov/women.html>, Umberto Cavallaro (2015) offers a useful brief introduction to this diverse group of women.

[3] Giler interviewed in *Alien Evolution* (Mark Kermode, UK, 2001).

[4] I am indebted to Lorrie Palmer and the anonymous readers for their incisive editorial comments on this essay, and also thank those panelists and delegates at SCMS Chicago 2017 who gave me the opportunity to present (and receive feedback on) an earlier version of this work.

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