

FEMALE SCIENTISTS IN FILM:
EMBRACING DUALITY WITH THE HEROINE'S JOURNEY

by

Anna Irina Sagatov

A thesis submitted in partial fulfillment
of the requirements for the degree

of

Master of Fine Arts

in

Science and Natural History Filmmaking

MONTANA STATE UNIVERSITY
Bozeman, Montana

April 2019

©COPYRIGHT

by

Anna Irina Sagatov

2019

All Rights Reserved

TABLE OF CONTENTS

1. THE PROBLEM: FILMIC DEPICTIONS OF WOMEN SCIENTISTS.....	1
Flicker Types.....	4
The Old Maid.....	4
The Male Woman.....	5
The Naive Expert.....	5
The Evil Plotter.....	6
The Daughter or Assistant.....	6
The Lonely Heroine.....	7
Will it Make a Difference? The Scully Effect.....	8
2. ANALYSIS OF FEMALE SCIENTIST CHARACTERS.....	9
Marie Curie in <i>Madame Curie</i> (1943) and <i>Genius: Einstein, “Chapter 5”</i> (2017).....	9
Dr. Christmas Jones in <i>The World is Not Enough</i> (1999).....	12
Dr. Ellie Sattler in <i>Jurassic Park</i> (1993).....	15
Lieutenant Ellen Ripley in the <i>Alien</i> series.....	19
Comparison of Female Scientist Characters.....	24
3. THE SOLUTION: THE HEROINE’S JOURNEY.....	26
4. APPLICATION.....	30
Why I Made a Fiction Film.....	30
<i>Bar Flies</i> Summary.....	31
Inspiration.....	34
Production.....	37
Sophie’s Character Influences.....	38
5. CONCLUSION.....	41
NOTES.....	43
WORKS CITED.....	44
FILMS CITED.....	48

ABSTRACT

There is a dearth of women in science, technology, engineering, and math careers. Film and television reflects this reality, and women scientist characters are often depicted as lacking in complexity or subordinate to their male counterparts. This thesis examines the deficiencies of filmic depictions of women scientist characters in dramatic films of the past and suggests using Maureen Murdoch's Heroine's Journey story structure to create more independent and complex women scientist characters in film. Inspired by this approach, the paper then discusses the dramatic narrative thesis film *Bar Flies*, which challenges audiences to consider the social, professional, and personal dilemmas a young woman scientist character faces while navigating her career and personal life.

CHAPTER ONE

THE PROBLEM: FILMIC DEPICTIONS OF WOMEN SCIENTISTS

Filmic portrayals of women scientists generally reflect cultural views and trends related to women in the workforce and society. These portrayals of women scientists are sources of information and influence about future professional roles for children and young adults (Steinke 2). Some films of the past that feature female scientists reinforce negative stereotypes. In Edmund Goulding's *The Flame Within* (1935), Anne Harding plays a successful psychiatrist engaged to a man who doesn't approve of career women. Over tea, she tells her groom-to-be, "I'm not going on with the work." "What are you doing to do?" he asks. "You tell me," she replies meekly, as happy ending music swells. The couple locks in an embrace (Goulding). In Sidney Salkow's film *Woman Doctor* (1939), Frieda Inescort plays Dr. Judith Randall Graeme, a reputable surgeon. Dr. Graeme overworks herself and "learns her lesson" by nearly losing her neglected husband to a rival and her daughter to an accident (March). In Mervyn LeRoy's film *Madame Curie* (1943), Pierre Curie warns his assistant David before Marie's first day working in the lab, "Always the continual struggle against woman, David...Woman loves life for the living of it. In the world of abstract research she's a danger, a distraction. She's the natural enemy of science..." (Osborn et al.). Even though the aforementioned films were made over seventy years ago (and Marie proves Pierre and David's assumptions wrong), these negative stereotypes remain embedded in our culture.

As filmmaking has become more accessible and society has advanced more toward equality, more films have been made that feature female scientists. In a study of seventy-four

popular films from 1991 to 2001 featuring scientists as lead characters, twenty-five of the seventy-four scientist characters were women. However, many of those twenty-five were not fully formed characters (Steinke 6). Since that study was conducted in 2001, more positive examples of women scientists have appeared in theatrically released films. For example, Natalie Portman played astrophysicist Dr. Jane Foster in *Thor* (2011) (Miller) and a biologist named Lena in *Annihilation* (2018) (Garland), and Sandra Bullock played astronaut Dr. Ryan Stone in *Gravity* (2013) (Cuaron). Film and society are both beginning to become more progressive, but these positive examples in film are still in short supply.

Women constitute 48% of the college-educated workforce in the U.S., but they hold only 28.8% of jobs in STEM (UNESCO). Twenty-four percent of graduate degrees earned by men are in STEM fields, compared to only 10% earned by women (21st Century Fox, et al.). There have been numerous investigations into the reasons for this discrepancy. In her book *Do Babies Matter?: Gender and Family in the Ivory Tower*, author Mary Ann Mason confirms that one major reason women are hired in lower numbers than men for superior positions in STEM is because of the belief that women will abandon their careers to become wives and mothers (8). According to social scientist Antonio Tintori, “Women are considered unsuitable for science because of their main – ‘natural’ – role as family caregivers, which cannot be combined with work as challenging as science. Thus, women and mothers are more likely to join the ranks of the second tier, or to drop out of academia and scientific labs, perpetuating the stereotype that science should be a men-only profession.” (4) Because men historically dominated science, the academic and professional world has been designed to work for them. When women are

penalized professionally for having families, it creates the assumption that they don't belong, or have to choose one or the other.

The uneven domestic workload in having a family is not the only factor in women shying away from the sciences. Lora E. Park confirms the converse relationship between female romantic pursuits and working in scientific fields in her paper, "Effects of Everyday Romantic Goal Pursuit on Women's Attitudes Toward Math and Science". Park writes that women see math and science as masculine fields, and in heterosexual relationships, women subconsciously seek to differentiate themselves from men when attempting to attract a romantic partner (158). On their own, men and women have equal aptitudes for math and science. In scenarios in which a possible romantic partner is introduced, women's aptitudes and interest in math and science declines (Park 159). In her essay, "As a Woman in Science, I Need to Conceal My Femininity to Be Taken Seriously" neuroscience PhD candidate Eve Forster writes that when she looks less like a woman, she is treated with more respect in the lab and in the classroom. To hide her femininity, she relies on a set of "female scientist tools" such as an unofficial uniform of long-sleeved, unrevealing clothes and an arsenal of prepared responses when her intelligence is challenged or she gets unwanted sexual attention. Forster even writes that she is treated differently depending on how she wears her hair. A study from 2016, "But You Don't Look Like A Scientist!: Women Scientists with Feminine Appearance Are Deemed Less Likely to Be Scientists" confirms that the more femininely a woman dresses, the less likely she is to be perceived as a scientist (Banchefsky 96). It seems as though the overwhelming evidence tells us that women scientists who exhibit feminine traits are unlikely to succeed. If we are to recognize

the value of feminine women as scientists in the real world, filmmakers should start writing more feminine female scientist characters who are respected and valued by their colleagues.

Flicker Types

Eva Flicker of the University of Vienna conducted a study of the portrayal of female scientists in sixty feature films from 1929 to 1997. She identified six different stereotypical portrayals of female scientists:

The Old Maid

This scientist is only interested in her work. She is undoubtedly competent, but she is depicted as lacking something. Her appearance is typically nerdy, but over the course of the film a man will appear who shows her the ways of love despite her routine rationality. This female character pays the price of her transformation into the perfect, attractive, and desirable woman: she loses her professional competence and slips up, making mistakes. According to this model, femininity and intelligence are mutually exclusive (Flicker 311).

In Dale Launer's 1992 romantic comedy *Love Potion No. 9*, behavioral biologist Diane Farrow played by Sandra Bullock is successful in her career, but nerdy and unattractive. She gets caught up in a male colleague's experiment with a love potion that makes her fascinating to anyone she talks to. She ends up with a makeover that leaves her unrecognizably beautiful and spends time dating a prince. After her love life becomes the focus of the film, her career is seldom mentioned.

The Male Woman

This female scientist is essentially a man in a woman's body. She is usually part of a team of men, dresses practically, occasionally succumbs to drinking and smoking to fit in with the men, and has masculine or asexual characteristics. The Male Woman is respected for her masculinity, and she is usually able to keep up with the men. However she is not taken seriously as a woman because she has masculinized herself (Flicker 311). Though it is positive to show that male and female characters are capable of overcoming the same challenges, this character finding success and respect by mimicking men suggests that masculine traits are superior.

Ellen Ripley played by Sigourney Weaver in *Alien* is a perfect example of a Male Woman type because Ripley's character was originally written in the script as a man. The president of Fox at the time requested that Ripley be changed to a woman, so producer David Glier had the secretary simply change "he" to "she" in the script (Gallardo-C 16). Ripley's bravery and tenacity earned her respect from her crew mates and audiences, and she ended up being the sole survivor of the expedition. She is a well-liked character, but there is nothing feminine about her personality.

The Naive Expert

This woman scientist does very little. She is crucial for the sake of the dramatization of the plot, but she does not contribute much to the solution. Instead, her femininity causes more trouble for the team of scientists. She is young, attractive, and subject to experience womanly emotions which add an extra layer to the existing predicament, forcing the man (or men) to solve the problem in order to get the team out of trouble. She is "naïve in her actions," messing up

tasks that are given to her despite her extensive education and knowledge, while her male counterparts stand in stark contrast and end up saving the day (Flicker 312).

Though Dr. Sarah Harding played by Julianne Moore in *Jurassic Park: Lost World* is a paleontologist, she does not help solve problems as much as drive the plot forward by putting herself in danger. The only reason Dr. Ian Malcolm agrees to go to the dinosaur-infested island at all is to retrieve Sarah because she is his girlfriend and he is worried that she is in danger.

The Evil Plotter

This character is young and very beautiful, and she uses her feminine charm to manipulate men into doing what she wants. She has an ulterior motive, which is on the opposite end of the spectrum from what the rest of the team is trying to accomplish. She is devilishly smart, but uses her scientific knowledge and sexual prowess for evil (Flicker 313).

At first, it seems as though Dr. Elsa Schneider played by Alison Doody in *Indiana Jones and The Last Crusade* is a competent historian aiding in the search for the Holy Grail. As the plot advances, it is revealed that she is a Nazi seeking the Grail for the Reich. She controls the men around her with her sexuality. She sleeps with both father and son, Professor Henry Jones and Professor Indiana Jones, in an attempt to get to the Grail.

The Daughter or Assistant

This role encompasses many filmic stereotypes of female characters. In this role, the woman scientist is subordinate to her male counterpart, who is either her father or her lover. She is smart and capable, but her secondary role does not allow her to demonstrate her abilities.

Flicker writes that when this woman plays the role of lover to the male scientist, "her work place is limited to the bed." She is only good for sexual satisfaction, not for the degree she earned (Flicker 314).

Nuclear physicist Dr. Christmas Jones played by Denise Richards in *James Bond: The World is Not Enough* is very clearly valued more for her appearance than her intellectual contributions to solving the problem at hand. She delivers a few lines in the film that are minimally helpful, but the rest of her dialogue is mostly expositional, sassy, or flirtatious.

The Lonely Heroine

This female scientist type is intelligent, attractive, and somewhat independent. Flicker says that she "has appropriated some male traits," such as losing herself in her work. She is both sexual and smart, and she manages to exhibit both qualities in the film. Despite this, she is still subordinate to the men on her team, and depends on them and their work in order to gain respect. She is the most progressive of the woman scientist types, but she lacks her own form of independence and still must rely on either the validation of a man's word or a sexual relationship in order for others to believe what she says (Flicker 315).

Ellie Arroway played by Jodie Foster in *Contact* is independent, ambitious, smart, and committed to her goal of understanding the communication coming from the extraterrestrial life she makes contact with. But no one believes that she has accomplished what she says because she has no proof. It is understandable to question unprovable findings, but later in the film, her male counterpart (who she was previously romantically involved with) is sent to validate her claims.

Will it Make a Difference? The Scully Effect

This thesis focuses on examples of female scientist characters in narrative films, but research on the effect of watching Dana Scully played by Gillian Anderson in the television series *The X-Files* is worth mentioning. The Scully Effect is the idea that watching Dana Scully, the brave, even-keeled field agent who constantly saves the day with her wits and weapon, has a positive effect on viewers' perceptions of women in STEM. A study conducted by the Geena Davis Institute of Gender in Media, 21st Century Fox, and J. Walter Thompson Intelligence proves its legitimacy.

Women who were medium/heavy watchers of *The X-Files* hold more positive views of STEM than non/light watchers, and several survey questions link this directly to the influence of Scully's character. The researchers found that:

- Nearly two-thirds (63%) of women who are familiar with Dana Scully say she increased their belief in the importance of STEM.
- A greater percentage of medium/heavy viewers of *The X-Files* strongly believe that young women should be encouraged to study STEM than non/light viewers (56% compared to 47%).
- Medium/heavy viewers are significantly more likely to strongly agree with the statement "I would encourage my daughter/granddaughter to enter a STEM field" than non/light viewers (53% compared to 41%).
- Medium/heavy viewers are more likely to strongly agree with the statement, "If I could go back and do it again, I would have studied or worked in an industry that is STEM" than non/light viewers (27% compared to 17%) (21st Century Fox, et al.).

Greater participation of women and other underrepresented groups in science and engineering is needed to ensure a diverse workforce to provide more varied perspectives to develop new questions, approaches, practices, and interpretations (Land of Plenty). Presenting positive portrayals of female scientists has been identified as a critical strategy for increasing the participation of women in STEM, so filmmakers should take note.

CHAPTER TWO

ANALYSIS OF FEMALE SCIENTIST CHARACTERS

Marie Curie in *Madame Curie* (1943) and *Genius: Einstein*, “Chapter 5” (2017)

In Mervyn Leroy's 1943 film *Madame Curie*, Greer Garson plays Marie Sklodowska, the top student and only woman in her physics classes at the Sorbonne in Paris. She is very poor and has no friends. Her professor takes pity on her and invites her to a gathering at his home where she meets Pierre Curie, played by Walter Pidgeon. Marie's professor suggests Marie work as Pierre's lab assistant. At first, Pierre is resistant to having a “girl” in the lab. He claims that “women are the natural enemy of science...” (Osborn et al). Though he initially resists, Marie proves herself an exceptionally bright scientific mind and Pierre begins to fall in love with her. After she graduates, she plans to leave Paris and move back to Poland to be with her father, but Pierre objects. In a very scientific but impassioned speech (he compares their relationship to the perfectly balanced NaCl compound), he proposes to her. Once they are married, the Curies get to work on identifying the unknown radioactive element in a rock called pitchblende. They ask for funding and facilities from the university but are relegated to a dilapidated shed. After four years of grueling work, they finally isolate and identify radium. Shortly after, Pierre is tragically killed in an accident in a collision with a carriage. Marie continues their work after Pierre's death, and twenty-five years later, she accepts the Nobel Prize.

Marie's character in *Madame Curie* certainly comes across as somewhat of an “Old Maid” type in the beginning of the film. Though beautiful, she is married to her career at the cost

of her health and social life. When Pierre falls in love with her, it is suggested that her partnership with him saves or completes her. Marie's original plan was to go back to her home in Poland to be with her father and teach after she graduates, but Pierre asks her to stay with him and continue working in Paris. He is fascinated by her mind, and their partnership is based on their mutual love of scientific discovery. When Pierre proposes to her, he justifies his interest in marriage logically:

Pierre: There would be no distractions. No fluctuations. None of the uncertainties and emotions of love...For the scientist there is no time for love. I have always believed science and marriage to be incompatible. But it's stupid to believe in generalizations. In our case it would be a wonderful collaboration. A *wonderful* collaboration! Don't you feel that?...It would be a very fine thing, I believe, to pass our lives together with our common scientific dream, to work together constantly in our search, and any discovery that we should make, no matter how small, would deepen the friendship we already have for each other and increase the respect we mutually feel.

Marie: I can imagine no future so full of promise as the one you offer now." (Osborn).

Though Marie's character seems to be an "Old Maid" type at first, her story does not follow the pattern Eva Flicker describes of abandoning all scientific pursuit once her love life is in order. Instead, Marie's scientific career is enhanced by her partnership with Pierre, and she continues their work after his passing. *Madame Curie* beautifully intertwines intellectual and romantic love and shows a successful and equal (as equal as was possible at that time in history) partnership between a male and female scientist.

While the Curies' partnership is ideal on an intellectual and professional level, the film does not portray the difficulties Marie faced in balancing the responsibilities expected of her as a housewife and mother in that era. Her daughter Eve Curie wrote in her biography about how Marie made tremendous efforts to make her husband's meals "appetizing". Marie managed it, but it was not easy to be the superwoman and the super scientist that- at least in her daughter's

version- Marie Curie seems to have been (Elena 271). De-emphasizing Marie's expected domestic responsibilities in the film ignores the fact that most women in that era were not allowed to simply set those things aside and devote their lives to their careers. In *Madame Curie* Pierre's father asserts that "women without children are parasites" (Osborn et al), and that they should not live if they won't give life. Marie does have children eventually, but they are only shown twice and very briefly, and nothing about them causes interference in Marie's research. This depiction of Marie is idealized (as is commonly practiced in film) in a professional sense, but it ignores some of the realities of her life as a woman which devalues the struggles she faced. Additionally, she needs Pierre to validate her as a scientist so she can be taken seriously. At that time in history, that was the reality of cultural attitudes toward women.

Marie Curie appears in episode five of the first season of the National Geographic series *Genius: Einstein* (Green) played by Czech actress Klára Issová. The Curies were contemporaries of Albert Einstein and his first wife, Mileva Marić Einstein. Albert played by Johnny Flynn, and Mileva played by Samantha Colley, met at Zurich Polytechnic where they both dreamt of being physicists. Mileva was the only woman in her classes, and Albert fell in love with her extraordinary mind. Mileva fell in love with the idea of a marriage based on constant scientific partnership. Once married, Mileva provided significant assistance to Albert with some of his early papers, but he never gave her credit. Throughout the series, Mileva struggles to find satisfaction in her life as a mother and housewife and resents Albert because she was robbed of the life she had hoped for and he achieved success because of her support (Green).

Unlike Einstein in *Genius*, Pierre Curie was committed to making sure his wife received equal credit as a scientist. He only agreed to accept a Nobel Prize under the condition that his

wife be given the award as well. Later in the episode, the Einsteins and the Curies spend a holiday in the Alps together. Marie Curie is Mileva's idol. Mileva confides to Marie that she has read all her papers and asks about balancing motherhood and her career. Marie says, "I didn't. My children never saw me, and now I'm afraid they hate me" (Green). While Mileva Marić very well may have had the potential to be an accomplished and notable scientist, she did not receive the respect and support from her husband that Marie received from Pierre.

Marie's character is so strong because she was a real person, so the complexity of her personality and her life comes through in her filmic portrayal. Though certain elements of her character fall into Eva Flicker's female scientist types, Marie does not completely fit into any one of them. She is brilliant on her own, and her husband's partnership bolstered her ability to explore her own intellect and scientific potential. After Pierre passed away, Marie continued his work as an independent, respected scientist and went on to win a second Nobel Prize for the chemistry of radioactivity.

Dr. Christmas Jones in *The World is Not Enough* (1999)

In the James Bond film franchise, "Bond girls" often play independent, highly intelligent roles as heroes, villains, other agents, or professionals. As autonomous as these characters are initially depicted, they are often identified as an adjunct to Bond, or in terms of their relationship to other male characters (Neuendorf 750). In director Michael Apted's 1999 James Bond film *The World is Not Enough*, Pierce Brosnan plays Bond and Denise Richards plays Dr. Christmas Jones, a nuclear physicist. Though it is usually assumed that a scientist character is intelligent and would likely offer valuable knowledge in solving a problem, Dr. Jones exists only to serve

the male gaze, to act as a love interest, and advance the plot which typifies her as either the “Daughter/Assistant” or the “Naive Expert” type according to Eva Flicker (314). To summarize, Dr. Jones accompanies Bond on his mission, but her most significant contribution to the film is her appearance.

It seems as though in the beginning of the film that Dr. Jones is aware of the difficulties of being an attractive woman in a male-dominated field, but she is not very competent at dealing with them. She is cold and snarky with Bond at first, but her scant wardrobe says otherwise. Her character is clearly written by someone who has no idea of the struggles she would face as a beautiful young woman leading a team in a male-dominated field, and the professional struggles she faces are the least of the audience’s concerns. Dr. Jones falls into typical passive female character tropes: the damsel in distress, and Bond’s “prize” at the end of his quest. She is a scientist in title, but certainly does not act like one.

Bond meets Dr. Jones soon after he arrives in Kyrgyzstan where she is working as a nuclear physicist. The camera immediately sexualizes her as it follows Bond’s gaze. He watches her strip off her protective lab suit to reveal a midriff-baring tank top and tight shorts. “Not interested in men, trust me...” a security guard warns as he notices Bond’s lingering gaze. Dr. Jones is unfriendly and cold toward Bond and warns him not to make any Christmas jokes as she walks with a noticeable swing in her hips in her skimpy outfit.

Audience members would likely read her putting up verbal defenses as a way to ward off Bond’s advances, but her wardrobe seems to contradict what she is saying. There is an idealization that women should be able to wear whatever they want and still be treated with respect. While this would be nice, the way characters of both sexes dress speaks volumes. If

Christmas' character had been working in her field for as long as she should have to achieve her level of education and authority, she likely would have learned how to dress more professionally so she would be more respected. Denise Richards defended Christmas's wardrobe in an interview with USA Today: "So many people made fun of how I was dressed when the movie came out. That's part of the appeal of Bond. These Bond girls are so outrageous and if I did really look like a scientist, the Bond fans would have been disappointed" (Freydkin). Sexy women in films aren't likely to go anywhere anytime soon, and Christmas Jones is part of the Bond girl tradition. Her wardrobe clearly establishes her character's purpose, and Richards knows it. She is there to serve the male gaze.

Dr. Jones accompanies Bond on his mission because he supposedly needs her knowledge of nuclear physics in order to complete his task, but her presence is largely useless and her actions are mostly passive or detrimental. Bond has to save her from danger multiple times per the classic damsel in distress trope (Feirstein). Most of her dialogue is passive, or simply pointing out the obvious action: "It's flooding!", "They're sealing us in!", "What do we do now?" (Feirstein). There are a few moments in which she does say or do something that mildly displays her intelligence, though it seems her character can't deliver an intelligent line without immediately being sexualized. For example, Bond and Dr. Jones are inside the oil pipeline trying to defuse a plutonium bomb moving at seventy miles an hour. As she is leaning backwards working on the bomb, she says, "It's a tactical fission device...Hold me steady." Though she is working to defuse a bomb on a moving object, the camera's focus is on Bond holding Dr. Jones' torso and her breasts in her tight shirt (Feirstein).

At the film's climax, Bond and Dr. Jones are in the flooding submarine trying to take back a stolen plutonium rod that will cause a massive explosion if inserted into the sub's nuclear reactor. Dr. Jones says, "If he had gotten the plutonium rod into the reactor we could've written off the whole city." (Feirstein). While this line demonstrates that she understands how a nuclear reactor works, her white tank top has become see-through in the water and her nipples are showing through her bra. At the end of the film, Dr. Jones naturally falls into Bond's arms- she is the prize at the end of the hero's journey. Though she warned him against making Christmas jokes when she first met him, the last scene of the film shows Dr. Jones and Bond in bed together as he says, "I thought Christmas only comes once a year."

Not only is Christmas Jones an abysmal example of a woman scientist character, she is also continually rated as one of the worst ever Bond girls. These listicles cite her unbelievability as a nuclear physicist as a major factor. Joshua Rich writes for *Entertainment Weekly*, "Let's review: Denise Richards played Dr. Christmas Jones, a nuclear physicist who wore a tank top and hot pants. Bloody hell, even Q didn't have a gadget to help Bond escape from that disaster." Perhaps she would have been rated more highly by audiences if she were a more believable nuclear physicist and actually used her intelligence to help solve the problem at hand. Instead, Christmas Jones was nothing more than a sexy prop making obvious proclamations, and a bad pun at the end of the film.

Dr. Ellie Sattler in *Jurassic Park* (1993)

In Steven Spielberg's film *Jurassic Park* (1993), Dr. Ellie Sattler played by Laura Dern is a bright, young paleobotanist. Dr. Sattler works closely and is romantically involved with Dr.

Alan Grant played by Sam Neill, a paleontologist. The two scientists are working at their dig site in Montana when John Hammond played by Richard Attenborough, the idealistic founder of Jurassic Park, arrives by helicopter and invites them to the island. In exchange for their expert's word that the park is safe for his lawyer and investors, Hammond offers to fully fund the scientists' research for the next three years. Needless to say, they agree to go (Crichton). Shortly after the group arrives on the island, John Hammond's grandchildren arrive as well and accompany the scientists on their tour. Dr. Grant is annoyed by the kids, but Dr. Sattler has suggested that she eventually wants children, so she subtly encourages the kids to spend more time around Dr. Grant. As the group travels deeper into the park, security begins to fail, dinosaurs escape from their enclosures, and people are killed. Drs. Grant and Sattler must work together to protect the children from the escaped dinosaurs, forming a pseudo-nuclear family. Eventually the remaining characters escape by helicopter. Dr. Grant holds the two sleeping children in his arms and Dr. Sattler looks on and smiles as they fly to safety.

Dr. Ellie Sattler is an excellent example of a strong, intelligent female scientist character who also happens to be maternal. John Hammond brings her to Jurassic Park because she is at the top of her field and respected. Upon arrival, she demonstrates her competency by pointing out that the welcome center building has been decorated using extinct toxic ferns which would be harmful to guests if touched. (Crichton) In the park, the group comes across an incapacitated Triceratops. Dr. Sattler sinks her entire arm into a pile of its droppings to learn what it ate that might have made the animal sick. It's disgusting, but she is not a squeamish person who shies away from doing her job. Later in the film, the park's power goes out which shuts off all the electric fences in the compound. There is a circuit breaker in another building that can be

switched, and Dr. Sattler is ready to find it and physically capable. John Hammond, injured and older, objects at first:

Hammond: But you know, I should really be the one going.

Ellie: Why?

Hammond: Well, because you're a - - and I'm a - -...

Ellie: We'll discuss sexism in survival situations when I get back.

Dr. Sattler grabs a radio and runs out through the velociraptor-infested forest to find the circuit breaker to turn the power back on. Hammond talks her through the process over the radio, and she successfully turns the power back on.

Not only is Dr. Sattler intelligent and competent, she is also considered attractive by Dr. Ian Malcolm played by Jeff Goldblum, a chaos theorist who is also on the tour of Jurassic Park. Dr. Malcolm makes a comment to Dr. Grant that demonstrates his interest, saying that he's "always on the lookout for a future ex-Mrs. Malcolm." Dr. Grant essentially rolls his eyes at him, but barely seems bothered by his comment. Dr. Sattler doesn't engage Dr. Malcolm's flirtations, and shows her feminist wit early in the park tour in her response to Dr. Malcolm's musings:

Malcolm: God creates dinosaurs, God destroys dinosaurs, God creates man, Man destroys God, Man creates dinosaurs...

Ellie: ...Dinosaurs eat man, Woman inherits the earth (Crichton).

Dr. Sattler's feminine characteristics do not detract from her strength. In his talk *Spielberg's Subtext: Jurassic Park*, designer Mike Hill argues that Dr. Sattler's purpose in the context of the allegory is to convince Dr. Grant that he should consider fatherhood, and that humans are stronger together as a family unit. Part of the appeal of the film is the relatability of two parental figures working together to protect children. Dr. Sattler shows Dr. Grant the beauty of family and the importance of caring for those you love by acting as a mother figure (Hill).

Acknowledging female characters who are ambitious as well as maternal is positive, but denying her sexuality is not. Like a Girl Scout mom in cargo shorts, Dr. Sattler is smart, nurturing, and prepared for anything. Though Dr. Malcolm makes a comment in passing about his interest in her, by and large, she is de-sexed. The majority of *Jurassic Park* is packed with action scenes of the group escaping from dinosaurs which doesn't leave much time for romance, but Dr. Sattler's relationship with Dr. Grant seems to be mostly based on professional collaboration. We seldom see sparks between them. (Crichton)

Why wouldn't there be more of a visible love story between Dr. Sattler and Dr. Grant? They are both at the top of their respective fields, and they are in a monogamous relationship to the point of discussing whether or not they want children. When Dr. Malcolm expresses romantic interest in Dr. Sattler, it barely elicits anything more than a dirty look from Dr. Grant.

There seem to be two definitions of feminine power in *Jurassic Park*: Dr. Sattler, the scientific, intelligent, brave, nurturing mother figure, versus the "monstrous feminine" dinosaurs-horrifying monsters lurking in the dark jungle with uncontrollable desires to consume, and unlimited potential to reproduce. Fear of uncontrollable reproduction is a notable theme throughout *Jurassic Park* (as well as in the *Alien* franchise). Elements of frog DNA used to complete the genetic code of the dinosaurs allowed the all-female dinosaurs to become hermaphroditic, (as some frog species do) and change sexes to reproduce with each other. This unsettling chaos tied to uncontrolled reproduction is a deep seated fear that exists in the human psyche, and Western culture has attempted to control reproduction with traditions such as marriage and socially ostracizing promiscuous women (Harari 78). Western culture associates sexual desire with animalistic instincts, nature, darkness, suffering, and loss of control (Campbell

55). Dr. Sattler is the logical, controlled, Puritanical woman who poses no threat to the operation with the distraction (or power) of her sexuality, so she is able to be tolerated in the “Ivory Tower” of science and the intellect.

Overall, Dr. Sattler is an excellent example of a strong, intelligent, attractive female scientist character. She has all the positive qualities of a competent scientist, but she is also not completely masculinized. She reinforces the existence of women who are both ambitious and maternal, but her sexuality is stifled. Instead, female sexuality is assigned to the terrifying female monsters that lurk in the depths of the dark and chaotic jungle.

Lieutenant Ellen Ripley in the *Alien* series

Lieutenant Ellen Ripley in Ridley Scott’s film *Alien* (1979) is an excellent example of Eva Flicker’s Male-Woman scientist type (Flicker 311). Ripley’s character was originally written as a man, but Alan Ladd, then-president of 20th Century Fox, requested that Ripley be cast as a woman instead. An admirer of Alfred Hitchcock’s films, Ladd believed audiences would become more engaged in the story if a woman were in peril such as in *Psycho* (1960) and *The Birds* (1963). Despite her changing sexes, Ripley’s character stayed quite masculine. “We really just had the secretary change ‘he’ to a ‘she’”, *Alien* producer David Glier said about the script. (Gallardo-C 16). Throughout the film she is bold and heroic, and she is mostly respected by her crew. Ripley’s dialogue stayed true to the writing of the original male character. The only scene in which she is sexualized is when, thinking she is finally safe in the rescue pod, she removes her suit to reveal her female figure in tiny white underwear and an undershirt (O’ Bannon). The Alien “xenomorph”, phallic jaws dripping with KY Jelly (an ironic, but

effective decision thanks to the Art Department), ominously observes her vulnerable body. This scene has become quite famous, and is anecdotally responsible for more than a few elder Millennials' sexual awakenings. To see Ripley essentially play a man- dominant, brave, strong, and powerful- and then strip off her suit to reveal the soft body of a woman? It's too good to be true.

To this day, Ripley remains one of the most beloved and complex female characters in sci-fi. Her "Male-Woman" characterization in the first film does not detract from her heroism and likability, but it does reflect our society's preference of masculine traits. Ripley is the sole survivor of the mission, and destroys the *Nostramo* in the end, saving humanity from the abuses and corruption of the Company. In *Aliens* (1986), James Cameron's sequel to *Alien* (1979), Ripley is quite changed from the woman she was on the first voyage of the *Nostramo*. While *Alien* (1979) established Ripley's heroism, bravery, and masculine qualities, *Aliens* (1986) reminds us that Ripley is in fact, a woman, and gives her an adopted daughter and ideal male partner in the end. If *Alien* (1979) Ripley was in response to the Second Wave feminist movement of the 1970s that called for equality between men and women, *Aliens* (1986) Ripley is a response to the return to conservative values of the Reagan Era that emphasized the importance of the nuclear family structure (Gallardo-C 66).

In the opening scene of *Aliens* (1986), Ripley's body is found in hypersleep in the recovered rescue pod fifty-six years in the future. She is brought back to Earth, and informed that the daughter she left behind years ago has died, childless (Cameron). No mention was made of Ripley's daughter in *Alien* (1979) (O'Bannon). This portrayal of Ripley as a neglectful mother creates a desire for her to redeem herself, and punishes Ripley for having been too motivated by

her career. When she tells authorities about the Alien, they don't believe her. She is painted as a hysterical woman. Suffering from horrific nightmares and post-traumatic stress disorder-like symptoms, authorities revoke her flight license and she is relegated to working at the loading docks as a lift operator. After contact was lost with a colony on LV-426 (the planet where her crew first encountered the Alien eggs), Ripley is requested to go with Colonial Marines aboard the ship *Sulaco* to investigate (Cameron). She agrees to go back- but only on the condition of complete Alien genocide. "We're going out there to destroy them. Not to study, not to bring back, but to wipe them out.", she says, determined to find closure from her trauma (Gallardo-C 84).

When Ripley arrives on LV-426, she and the crew find the colonies have been ravaged by the Aliens, save an orphaned girl named Newt. Ripley takes her in, and the audience is reminded of her lost daughter. Ripley is, in a sense, given a second chance at motherhood. Throughout the film, she continues to be heroic *and* maternal. Her crew member, Corporal Dwayne Hicks, steps in as an ideal potential husband/father figure, and Ripley's actions are now motivated by a desire to keep her "family" safe (Cameron). This theme is seen frequently with female protagonists in other films- that women are motivated to keep their families safe more than anything else. Otherwise, the only thing that gives them license to go out and pursue a quest is if they have no family. For example, in Alfonso Cuarón's *Gravity* (2013), Sandra Bullock's character Ryan, a single mother, lost her only daughter in an accident (Cuarón et al.). In Alex Garland's *Annihilation* (2018), Natalie Portman's character Lena is searching after her lost husband (Garland). The end of *Aliens* (1986) sees the new family returning home safely, all together, to live the American Dream (Cameron).

Ripley's portrayal in *Aliens* (1986) is generally criticized as being driven by conservative family values (Gallardo-C 65). As opposed to the Ripley of *Alien* (1979) who was completely masculinized and driven by survival and destroying the Alien, audiences see her maternal and familial drives in *Aliens* (1986) as a feminine character cliché; a flaw. It is true that female characters are too often portrayed as having the protection of their children and family as the driving force behind their action, and it is refreshing to see a female character whose family is never mentioned in *Alien*. She is independent, acting on her own will to save herself and her crew members. Her value is not as a wife and mother, but as another crew member.

This criticism is interesting because, while it is positive to see a woman who is equal in capability and competency to a man, it shows the author's unconscious bias toward masculine traits. The biological drive to protect offspring and family is experienced by people of both sexes. If a male character protects a child it is viewed as heroic, but it seems to devalue Ripley in audience's eyes because that is what a typical woman would do. In *Aliens* (1986), Ripley is driven by both the desire to save a child and the desire to wipe out the xenomorphs. But the more she is associated with the feminine cliché, the less audiences respect her. It is possible that audiences saw her "conforming" to traditional feminine gender roles as weakness after being the definition of the "kick-ass" Male Woman and Second Wave Feminism, but concern for the well-being of the weak should not be devalued. Additionally, Private Vasquez, a hyper-masculinized female crew member in *Aliens* (1986), plays the "Rambette" to Ripley's "Snow White", as she is referred to when they first meet (Cameron). Vasquez is a hard-bodied and tough Marine who works out in the gym, smokes, and drinks with the boys. In comparison,

Ripley seems soft, vulnerable, and weak. Clearly Ripley is incredibly resilient and strong, but visually she contrasts starkly with Vasquez which further establishes her femininity.

Ripley's character transforms significantly in each film in the *Alien* franchise. In *Alien* (1979) she is a heroic Male-Woman, in *Aliens* (1986), she is just as brave as before, but motivated in part by maternal drives and played as more feminine compared to hyper-masculine Vasquez. *Alien3* (1992) puts her on a hellscape prison planet of YY chromosome criminals and she must masculinize herself to survive and fend off rapists, and in *Alien: Resurrection* (1997) her DNA is crossed with the Alien Queen in a bizarre Frankenstein-like story. She is arguably one of the most well-developed woman scientist characters in film history. John Scalzi, film critic and president of the Science Fiction and Fantasy Writers of America, wrote in 2011:

She's not a sidekick, arm candy, or a damsel to be rescued. Starting with *Alien*, Ripley was a fully competent member of a crew or ensemble — not always liked and sometimes disrespected, but doing her job all the same. As each film progresses, she comes to the fore and faces challenges head-on — she's the hero of the piece, in other words...Ripley isn't a fantasy version of a woman. Science fiction film is filled with hot kickass women doing impossible things with guns and melee weapons while they spin about like a gymnast in a dryer. As fun as that is to watch, at the end of the day it's still giving women short shrift, since what they are then are idealized killer fembots rather than actual human beings. Ripley, on the other hand, is pushy, aggressive, rude, injured, suffering from post-traumatic syndrome, not wearing makeup, tired, smart, maternal, angry, empathetic, and determined to save others, even at great cost to herself. All without being a spinny killbot (Bryant).

Winona Ryder recalls her reaction to watching Ripley in *Alien*:

I was about eight. But I remember the impact it had on me. I had never seen a female character like that...she was the survivor...of course we've seen guys doing that a lot. Guys surviving, being the hero. Girls really just being mostly the victim. And this time it was great to see a woman really, you know, kick ass for the first time (Gallardo-C 3).

The authors of *Alien Woman* and numerous sci-fi film bloggers consider Ripley to be one of the best (if not the best) female character in science fiction, which is unfortunate considering how long it has been since the *Alien* franchise was made. Since 2006 when *Alien Woman* was

written, more positive examples of women scientists have emerged on screen. Even so, none have come close to the heroism, complexity, and strength of Ripley. We need more self-determined, powerful protagonists like her. Though if our culture is going to value feminine qualities, we need to show that a female heroine can be admired for embodying both the strength and bravery of the masculine *and* the empathy, compassion, and emotional intelligence of the feminine.

Comparison of Female Scientist Characters

Crafting a believable, likeable, and feminine female scientist character has clearly been a challenge for filmmakers. This is in part due to the socio-cultural climate in which women and science are not (historically) of the same world, and people tend to like what is familiar to them. We are making strides toward equality, but there is still work to be done.

Of the examined film characters, Marie Curie is the strongest and most complex character as she was a real person. She was a highly accomplished scientist, and had both a rich intellectual/professional and love life. This is not as apparently seen in the other characters. *Jurassic Park's* Dr. Ellie Sattler was highly intelligent and competent, but any hints at her romantic life were diminished. She expressed interest in having children, but not in any of the activities that would get her there. Dr. Christmas Jones was certainly a sexual person, but that came at the expense of her intellect. Though she was supposedly a smart nuclear physicist, her sole purpose in *The World is Not Enough* (1999) was to be eye candy. On the other end of the spectrum, Lt. Ellen Ripley in *Alien* (1979) was respected because of her bravery and competency, but she was masculinized up until the very end of the film when she appears in her

underwear. She embodied the duality of masculine and feminine strength in *Aliens* (1986), but both the film and this iteration of Ripley's character were not well-liked by audiences.

It is very difficult to find a female scientist character in film who is intelligent and effective at problem solving *and* attractive. Sexual availability seems to distract away from any other qualities a woman may have to the point where, if a woman is beautiful and/or sexually available, that is often presented as her only true value. Women scientists are more than either bimbos in lab coats or smart-but-desexed robots. In order to normalize the presence of women in the lab, filmmakers need to write more female scientist characters who are effective problem solvers, have complex personalities, *and* sexuality; and their sexuality does not need to impede their work or the work of people around them.

CHAPTER THREE

THE SOLUTION: THE HEROINE'S JOURNEY

The Hero's Journey as identified by Joseph Campbell has been a pervasive pattern throughout the history of storytelling. Though when asked about how female characters experience the Hero's Journey in an interview, Campbell reportedly said, "Women don't need to make the journey. In the whole mythological journey, the woman is there. All she has to do is realize that she's the place that people are trying to get to." (Murdock 8). One of Campbell's students, psychotherapist Maureen Murdock, disagreed and developed the Heroine's Journey.

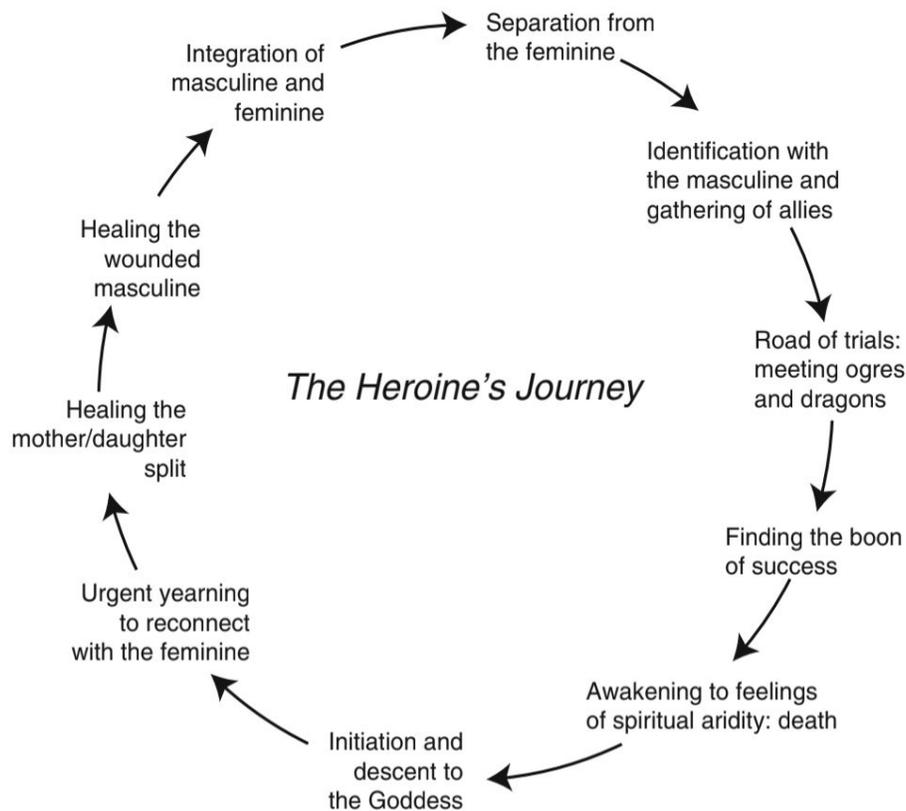


Figure 1. The Heroine's Journey as defined by Maureen Murdock.

The Heroine's Journey is based on the experience of "father's daughters who have closely identified themselves with the father, or dominant masculine culture in a world in which feminine values are considered to be inferior." (Murdock 5). This may cause the female character to lose touch with or devalue her mother, and develop an inner self-loathing for being female. There are numerous factors, both biological and cultural, that contribute how closely people perform "masculine" or "feminine" gender roles. Biologically, high testosterone is a predictor of higher risk taking, assertiveness, and confidence⁴ (Coates 335). Estrogen supports the part of the brain involved in social skills and observations, encourages bonding and connection, and discourages conflict and risk taking (Shipman). In Western culture, masculinity is typically associated with success and productivity. Femininity is generally perceived as weak, powerless, or manipulative, and that negative perception can be so strong that female characters reject the positive elements of femininity, such as nurturing, empathy, community mindedness, emotional expressiveness, and creativity (Fisher). This also happens on a collective level, thus leading to the general villainization of women. The Salem Witch Trials are a classic example of mass hysteria caused by women who were perceived as not performing their proper societal roles. When women are punished for being powerful, it seems understandable for them to devalue themselves and their mothers. This stage in the journey is when the heroine falls for the idea that she must become more masculine in order to be good.

Because she believes her femininity makes her inferior, the heroine actively chooses to pursue success in the world of the masculine. She associates with her father, the professional realm, the church, or a group of male friends or teammates. She carefully chooses all her actions to make herself look better to her masculine allies; she never does anything because she simply

wants to do it. She is always compensating for the feminine lurking within her. Like the hero, she goes through trials and tribulations (“ogres and dragons”, as referred to by Murdock) to make herself better. These challenges are usually focused on achieving prestige, financial equity, or power. She succeeds in this realm because she has taken on masculine traits, and she has overcome challenges and become independent and respected. This half of the journey has been led by only the mind. As a consequence, she has repressed the desires of her soul and lost touch with her deep self. Her success is superficial and fleeting, and she is left unsatisfied.

She asks herself what she has lost in this journey. Her relationship with her inner voice is estranged, she has stifled her creativity. She experiences a spiritual death, which is often represented by a descent into a dark abyss or a separation from community or family. She needs to reclaim the feminine parts of herself that she has amputated; the parts that have been ignored, devalued, and repressed in her quest for success. This may be the heroine repairing the relationship with her mother or daughter, or reuniting with the divine feminine. In this process of reclaiming the feminine, she may come to resent the voices that told her to repress her emotions and tough it out- the male characters in her life as well as her inner masculinity. She may try to destroy this part of herself or her life that caused her pain. In order to move forward, she must acknowledge the value of her inner masculinity and masculine characters in her life which gave her bravery and the confidence to bring her desires into fruition. The heroine finds completion by embracing her dual nature- the masculine and feminine within herself (Murdock).

This inner journey of self-discovery and embracing duality can add emotional depth to any character born into a world in which they believe they do not belong. Nancer Ballard, Resident Scholar at Brandeis University, is the founder of the Heroine Journeys Project which

analyzes films and literature based on the Heroine's Journey. Over the past thirty years, most winners of the Best Picture Academy Award followed the Hero's Journey in which the hero's goal is to achieve power or to bring wealth back to their communities. Ballard has identified Best Picture winners with protagonists that fit the Heroine's Journey; misfits whose quests are based on finding wholeness (Ballard).

- Jonathan Demme's *The Silence of the Lambs* (1991) features a female protagonist (Tally).
- Anthony Minghella's *The English Patient* (1996) features a female protagonist (Minghella).
- Ron Howard's *A Beautiful Mind* (2001) is about a male protagonist who is mentally ill (Goldsman).
- Paul Haggis' *Crash* (2005) features multiple outsider protagonists and overall story examines racial prejudice from many angles (Haggis et al.).
- Kathryn Bigelow's *The Hurt Locker* (2009) is about a male protagonist with PTSD (Boal).
- Tom Hooper's *The King's Speech* (2010) features a male protagonist with a speech impediment (Seidler).
- Michel Hazanavicius' *The Artist* (2011) features a male protagonist who is literally without a voice (Hazanavicius).
- Steve McQueen's *12 Years a Slave* (2013) is the story of disenfranchised African American male protagonist who is enslaved (Ridley).
- Barry Jenkins' *Moonlight* (2017) is about a gay African American protagonist (Jenkins).
- Guillermo del Toro's *The Shape of Water* (2018) features a female protagonist who frees a fantastical river creature from government experiments (del Toro).

The Heroine's Journey is an excellent tool to explore stories of outsiders coming to terms with the difficulties they were born into, which makes it an ideal framework to tell stories of women scientists- characters who occupy a world where they might feel like they don't belong. If filmmakers apply the message of finding completion in embracing masculine/feminine duality, more viewers may see how women's perspectives and unique strengths can add value to a lab environment.

CHAPTER FOUR

APPLICATION

Why I Made a Fiction Film

When I began my masters studies, I wanted to make documentaries to communicate scientific ideas to as many people as possible. After my second year in Montana State University's Science and Natural History Filmmaking MFA program, I moved to New York and found myself unexpectedly working in the fiction film industry. In the fall of 2017, I was hired as a production assistant on an indie feature film, a 1950s period piece about a traveling lobotomist. I was tasked with driving our lead actor to and from set. On our drives, we discussed science communication in film. He has played multiple scientist roles in past movies, and I realized how much those characters, and fiction films about science in general, have inspired public interest in science. *Jurassic Park* has inspired curiosity about evolution, DNA, and countless paleontologists, and the plot of *The Fly* deals with genetics and teleportation. In addition to those films, I was also inspired by how Denis Villeneuve's *Arrival* (2016) addressed the proven study that learning a different language changes the speaker's perception of time and the world around them. The National Geographic scripted series *Genius* humanized Albert Einstein's character while presenting his scientific findings in a visually stunning and creative way.

These interactions had a major impact on my thesis film. I considered the power of seeing yourself in a film character and empathizing with their story. I thought about what I wanted to communicate to the world about female scientists, and if I could possibly find a documentary

subject that would allow me to simultaneously communicate science and make commentary about gender roles and my generation. I was unable to come up with an accessible documentary subject, so I wrote a fiction script about a character who was going through a relatable experience with underlying themes about more serious issues. I decided to make my film about the neuroscience of sex and alcohol consumption because those are provocative, relatable topics. I also wanted to communicate the challenges women scientists face in navigating the search for a satisfying love life and a fulfilling career, and I wanted to comment on my generation's attitudes toward relationships and how our definition of femininity is changing. While science documentaries about certain topics can certainly inspire an emotional response in audiences, I felt that my previous documentary work had not achieved that goal. I wanted to try communicating science while eliciting an emotional response from the audience by telling a fictional story. I felt that a fiction film would allow me the creative control to accomplish all of those things, especially in the areas of emotion and thought I wanted to explore. Simply put, I wanted to use storytelling techniques that were traditionally unavailable to me in the documentary format to communicate my ideas.

Bar Flies Summary

I decided to call my film *Bar Flies* to allude to the *Drosophila* fruit flies used in the experiment that inspired by film and the protagonist's enthusiastic drinking habits. In the opening lab scene, Sophie is battling a hangover from the night before but is also very focused on her scientific work. Luke tries to flirt with her, but she shuts him down when he asks her to grab a drink because she has decided that she does not consider romantic or sexual relationships

with colleagues. She is interested, but has programmed herself not to act on desires she thinks she should not be feeling as a professional.

After Luke leaves, Sophie goes to a meeting with her advisor, Dr. Ingrid Carr. Dr. Carr is an older soon-to-be divorcee who had a family *and* came up in the ranks of a male-dominated industry during a time when it was even more difficult for women to advance. She sees Sophie, an idealistic Millennial who believes that she can have it all, as naive with a very long road of difficult choices ahead of her. Dr. Carr wants to prepare her for that. Sophie feels frustrated by Dr. Carr's unwillingness to accept that "things are different now" but Dr. Carr has lived through this and knows better. Sophie has an unconscious suspicion that perhaps Dr. Carr might be right, but she doesn't want to believe it. She also still feels the pressure to please Dr. Carr because she is her superior. After a frustrating meeting, Sophie decides that she does need a drink, and heads to the bar where Luke said he would be.

In the next scene, Luke is sitting at the bar waiting for a Tinder date who never showed up. Just as he is about to get up and put on his jacket to leave, Sophie walks in. He puts his jacket back down and pretends not to have noticed that she came in as she sits down next to him. They have awkward conversation about their work, Sophie makes an uncomfortable joke, expresses her frustration with Dr. Carr, and eventually they start drinking more heavily. Flirting continues, and their body language shows that they are definitely interested in each other. Luke gets up to use the bathroom, and when he's gone, Sophie sees Dr. Carr walk in with a male colleague. Suddenly uncomfortable and stiff, she slouches in her chair trying to avoid being seen. Luke swaggers back from the bathroom, having decided he's ready to make his move. He cozies up to Sophie who is now even more uncomfortable, aware of the possibility of Dr. Carr's gaze. Luke

brushes her shoulders and makes a comment about how they had been talking about “drunk sex...”. He continues, “So...in the interest of...saving ourselves hangovers in the morning...” As he leans in for a kiss, Sophie panics. “Do you wanna...” Sophie throws the rest of her drink in Luke’s face, and yells at him, “You’re such a CREEP!” and storms out, in an attempt to put on a show for Dr. Carr. Luke is shocked, face dripping, and exits the bar. Dr. Carr scoffs at him mildly amused as he walks out.

Sophie knows she has acted out of turn and waits for Luke outside the bar. He is angry, humiliated, and wants nothing to do with Sophie. She apologizes and does her best to talk him down. Though he has made up his mind that he’s not interested in her anymore, eventually he agrees to let her walk him home.

In the next scene, the two drunk scientists are walking arm in arm down the sidewalk, giggling and making jokes. When they arrive at Luke’s house, they embrace, and Sophie sheepishly apologizes for throwing her drink in his face. She looks up into his eyes with her arms around his neck. He smiles at her and pauses, and for a moment it seems like he might kiss her, but then he says, “OK, I gotta go...” and waves goodbye and goes inside. Sophie is visibly disappointed, and she shuffles back to her lonely apartment. When Sophie gets home, she has one more glass of wine. At the same time in his apartment, Luke has a beer in the shower. Sophie gets cozy with her laptop in bed as she searches for porn, and Luke squeezes some body wash into his hand and we see a wide shot of his silhouette beginning to masturbate. Sophie ends by referencing that she’ll be activating the neuropeptide-F pathway (“neuropepti--pff--whatever it’s called”), which is the pathway in the brain that she is studying which is activated by both sex and alcohol consumption.

Inspiration

I came across the study that inspired my script, “Sexual Deprivation Increases Ethanol Intake in *Drosophila*” by Galit Shohat-Ophir, et al., in my research for a longer script I had been developing, *How to Think Your Way Out of Love*, about the science of love and attraction. Pop-science publications and even women’s magazines published numerous articles about this study, likely because of its comically obvious findings that sexually deprived fruit flies drink four times as much alcohol as mated fruit flies. Most adults in mainstream Western culture could tell you that you will find the same pattern of alcohol consumption habits in sexually deprived humans. We are just pleasure-seeking animals, no better than fruit flies, though some of us might be sexually deprived because of our own fears of social rejection. I decided to use this as a framework to explain Luke and Sophie’s backstory. These two neuroscience grad students who work in the same lab are attracted to each other but decide not to pursue a romantic relationship. I wanted Luke and Sophie to unknowingly act out the very study they were conducting, but also acknowledge the complications of sleeping with someone you work with. In *How to Think Your Way Out of Love*, Luke and Sophie are strictly platonic friends. Some people believe true platonic friendships between heterosexual people of the opposite sex are impossible. Speaking from experience I know this to be false, but sometimes the origins of these friendships are predicated on initial romantic interest and evolves into friendship. I wanted to explore the sequence of events that possibly could have landed Luke and Sophie in the “friend zone” and also address how Sophie’s conflicted feelings about prioritizing her career caused the night to end the way it did.

As for the scientific study, it was comedic to me that humans seek to activate neuropeptide pathways that bring them pleasure in the same way as fruit flies. The brain rewards us for doing things that aid in our survival and passing along of genes, and alcohol artificially activates these pleasure pathways (Shohat-Ophir). Reducing the complicated world of love and sex down to how to activate pleasure pathways as much as possible can inspire countless emotions, from existential dread, to amusement, to an anesthetized and calm peace of mind. We are just animals. Geoffrey Miller, author of *The Mating Mind*, would argue that everything we do, including art, music, or any display of intelligence or talent, is to make us more attractive to potential mates (3). If that were the case, one would assume that Sophie would do whatever she could to be more attractive to Luke. But her prioritizing her career actually diminishes her chances of sleeping with him. Sex has the possibility of being very biologically (and socially) expensive for women if it results in pregnancy which is why women are inherently more sexually selective. Now with birth control, women can have sex with much less risk of pregnancy, but Sophie does not want to even explore the path of love and a relationship if it could potentially come at the cost of her career. Her prioritizing her career over reproduction is driven by her fear of losing her independence and the position she has worked so hard to achieve.

There are several hypotheses about why women have been subjugated so frequently throughout human history. Anthropologists hypothesize that because pregnancy and raising a child are so physically debilitating, mothers' and babies' chances of survival significantly increased if they relied on able-bodied men to provide for them during those times (Harari). In the Agricultural Revolution, men who worked the land wanted to be sure that they were passing on their property to their offspring, so women were limited to one partner (Harari). In many

cultures around the world, women were (and in some places still are) considered to be property, and marriage traditions established which woman belonged to which man.

Now that there is infrastructure in place for women to live independently and have children completely on their own if they choose, having a stable career that allows for much more agency seems like an excellent option. Even still, Sophie is pulled in multiple directions: she's interested in a connection with Luke, but she is also driven by her career and does not want to potentially get derailed from her path, fail, and disappoint Dr. Carr. Sadly, she does not think that she can have both a demanding career and a healthy relationship with someone who she connects with intellectually.

Regarding Sophie's relationship with Dr. Carr, I wanted to acknowledge the differences and difficulties that previous generations of women have dealt with in advancing in male-dominated fields. Sophie's advisor Dr. Carr very likely would have had to put up with much more blatant sexism and more significant roadblocks in a less tolerant time. She may have felt that she needed to make herself very masculine in order to fit in, and she may have had a sense of superiority over Sophie because she advanced in her career during a time when it was much more difficult. Dr. Carr wants to appear respectable and serious, so she takes pride in her appearance and dresses professionally. Sophie's generation has been told that they shouldn't have to prioritize their appearance to be respected, so she dresses much more casually. Dr. Carr may see Sophie and her generation as too sensitive and entitled, and Sophie may see Dr. Carr as too militant and rigid in her thinking. Dr. Carr is wise enough to know the sacrifices that come with the life she has chosen. Sophie doesn't think she has to make sacrifices, but subconsciously

she is concerned that Dr. Carr might be right. The harsh reality is a hard pill to swallow, and she doesn't want to accept it. Her actions reflect the subconscious reality of her fear.

The cultural discussions of the Millennial generation such as the #MeToo movement and the Sheryl Sandbergs of the world say that women should be able to have both a satisfying career and a happy family life, that gender is a social construct, and that men must respect women no matter how they are dressed. These idealistic assertions sound positive in theory, but they ignore the realities of biological sex differences, hormones, and social and cultural conditioning. Many of these ideas are certainly things to strive for, but we cannot simply ignore the realities of our current situation. Cultural change does happen, albeit slowly. Somewhere between Dr. Carr's generation completely masculinizing themselves and Sophie's generation's blind idealism, there is a realistic feminism. Sophie is just trying to figure out how she can *actually* have it all.

Production

I chose to make *Bar Flies* because I wanted the creative control that comes with narrative filmmaking, and I wanted to craft a relatable woman scientist character in a media landscape where these characters are difficult to find. I have been curious about the science of love for quite some time, and after I made the decision to write a fiction piece instead of a documentary, writing was not difficult. It took me one month to write *Bar Flies* and I finished in June, 2018. I cast actors and selected department heads who I had worked with on sets in the past and worked with them to find crew members to fill out their departments. I was committed to paying my cast and crew fairly from the beginning, so I conducted a crowdfunding campaign on Seed&Spark and raised \$15,000. I selected my editors based on their expertise and responsiveness to my

feedback. This was my first experience hiring crew, but I felt that hiring individuals with more experience with narrative film was a more efficient decision. Writing a narrative script and directing actors were new experiences for me, but I enjoyed discussing character inspiration and the elements the actors brought to the characters I wrote.

Sophie's Character Influences

Sophie is no Ellen Ripley. She is awkward and nervous. She is doing her best to navigate life as a Millennial trying to date casually, a human being who wants to hook up, and a female scientist seeking career success. She wants to “have it all” as she has been told she should be able to by the *Lean In* tribe of powerful women who have “made it”. Sophie’s character is not inspiring or heroic. She is not Dana Scully, using her intelligence and level-headedness to solve problems. She is an intelligent and ambitious scientist, but she is also confused and still figuring things out. *Bar Flies* is a momentary glimpse into an evening in Sophie’s life, and she is trying to reconcile the conflicting needs and desires of her multiple identities. My goal in writing her character was to show that she is relatable, and to normalize characters like her as scientists. Intelligence should not alienate a character from the rest of the world. While scientists undoubtedly deserve to be respected, society tends to put them on a pedestal and isolate them from “regular people”. Audiences need to see that scientists struggle with the same emotional and human desires as everyone else. Filmmakers need to help scientist characters “escape from the Ivory Tower” (per Nancy Baron’s book on effective science communication) so audiences can relate to them and see themselves in these characters, thus inspiring more interest in science.

In terms of comparisons to other typical representations of women scientists, Sophie is the active protagonist, and she and Luke are equals. Sophie's character is not defined by her association with Luke, and their "love story" is not the main focus of the narrative. If she were to be defined into one of Eva Flicker's woman scientist types she would likely be closest to the "Lonely Scientist" because of her independence and commitment to her work. *Bar Flies* is about the multiple identities women in the professional realm feel they must embody, and how there doesn't seem to be a clear answer for how to be successful without giving something up.

Elements of the Heroine's Journey can be applied to how Sophie's character arrived at her position in life. She achieved a certain level of success by embracing masculine traits. Maureen Murdock emphasizes the difficulty women face of the pull of the attractive masculine world (Murdock 17). Men get things done, and productivity is rewarded in Western culture. In *Bar Flies*, Sophie has battled some of the "ogres and dragons" and is a successful Ph.D. candidate, but she is realizing that she can't find true satisfaction solely in her career. She feels that she cannot have both career success and a romantic relationship because the masculine narrative, presented by Dr. Carr's character, tells her she cannot. To Sophie, her career seems like a more reliable pursuit, but she can't ignore her desire for human connection. Sophie wants to embrace the masculine/feminine duality within herself but is having a difficult time defining it. Society would like us to believe that the narrative of women having to choose love or career is fading, and culture is starting to catch up, but we still have a lot of work to do. The academic and professional worlds were designed by men for men. Women who want to have families are punished because domestic labor and childcare still falls most heavily on women. Even engaging in romance seems to be a scary path to take for Sophie because it can lead to family and babies,

and Sophie would rather not even go there. It's easier to discount those desires as animalistic, indulgent, and not worth pursuing. *Bar Flies* asks the audience to consider, "How can women make it work"?

CHAPTER FIVE

CONCLUSION

Representation of women scientists in the real world and in film is better than it has ever been, but we still have a very long way to go. Complex, fully formed women scientist characters are still a minority. Of those we see on screen, almost all are lacking in competence compared to their male counterparts. They play subordinate or assistant roles, or they can only justify pursuing their career if they have no family. Filmmakers can inspire change in society by portraying more women scientists as equally competent, valuable, and complex as their male counterparts.

I want to use film as a tool for social change. I wrote my narrative short to craft a relatable character, to communicate science, to comment on social issues, and to elicit an emotional response from the audience. The power of narrative and empathy is strong, and I wrote Sophie's story to encourage audience members to consider frustrating societal issues and the science of love in an entertaining way. While *Bar Flies* does not offer a solution to these complex problems and Sophie might not inspire audience members with bravery or strength or wisdom, her being a scientist normalizes women in the lab and her struggle brings awareness to these issue so audience members might offer more support to women pursuing science. Filmmakers can use the Heroine's Journey story structure to write female scientist characters who are complex, flawed, interesting, and enhanced by the dual nature of their inner masculinity and femininity.

NOTES

1. Though Ripley is a warrant officer, she is also an astronaut which classifies her as a scientist.
2. “Male characteristics”, or “masculinity” is defined biologically by behavior that occurs when a human has dominant testosterone such as inventiveness, independence, assertiveness, confidence, competitiveness, decisiveness, analytical thinking, aggression, and high sex drive (Coates 335).
3. “Feminine characteristics” or “femininity” is defined biologically by behavior that occurs when a human has dominant estrogen such as risk aversion, intuition, creativity, idealism, introspection, emphasis on community, long-term planning, empathy, and nurturing (Fisher).
4. A study from Cambridge University has tied high testosterone levels to an appetite for risk taking. Scientists followed male traders at a London hedge fund, all high rollers (with annual bonuses greater than \$5 million). Using saliva samples, the researchers measured the men’s testosterone levels at the start and end of each day. On days when traders began with higher levels of testosterone, they made riskier trades. When those trades paid off, their testosterone levels surged further (Coates 336).

WORKS CITED

21st Century Fox, et al. "The Scully Effect: I Want to Believe in STEM." Geena Davis Institute on Gender in Media, 2018, *The Scully Effect: I Want to Believe in STEM*.

seejane.org/research-informs-empowers/the-scully-effect-i-want-to-believe-in-stem/

Ballard, Nancer. "Drama and Film." *The Heroine Journeys Project*, 2 Apr. 2015, heroinejourneys.com/examples/drama-and-film/.

Banchefsky, Sarah, et al. "But You Don't Look Like A Scientist!: Women Scientists with Feminine Appearance Are Deemed Less Likely to Be Scientists." *Sex Roles*, vol. 75, no. 3-4, Aug. 2016, pp. 95–109., doi:10.1007/s11199-016-0586-1.

Borgia, Jake Martyn. "Gender and the Horror Film: Birth, Rape and Female Sexuality in Ridley Scott's *Alien* (1979)." Bournemouth University, 2017.

Britton, Dana M. "Do Babies Matter? Gender and Family in the Ivory Tower by Mary Ann Mason, Nicholas H. Wolfinger, Marc Goulden." *American Journal of Sociology*, vol. 120, no. 3, Nov. 2014, pp. 988–990.

Bryant, Adam. "Ellen Ripley Is Clearly the Best Female Character in Scifi Film, and That's a Problem." AMC, 2011, www.amc.com/talk/2011/09/ellen-ripley-is.

Coates, J. M., et al. "From Molecule to Market: Steroid Hormones and Financial Risk-Taking." *Philosophical Transactions of the Royal Society B: Biological Sciences*, vol. 365, no. 1538, 27 Jan. 2010, pp. 331–343., doi:10.1098/rstb.2009.0193.

Davis, Geena. "Global Film Industry Perpetuates Discrimination against Women." UN Women, 22 Sept. 2014, www.unwomen.org/en/news/stories/2014/9/geena-davis-study-press-release.

Denby, David. "Sex and Sexier: The Hays Code Wasn't All Bad." *The New Yorker*, 2 May 2016. www.newyorker.com/magazine/2016/05/02/what-the-hays-code-did-for-women

Feirstein, Bruce, writer. Apted, Michael, director. *James Bond: The World Is Not Enough*. Metro-Goldwyn-Mayer, 1999.

Flicker, Eva. "Between Brains and Breasts—Women Scientists in Fiction Film: On the Marginalization and Sexualization of Scientific Competence." *Public Understanding of Science*, vol. 12, no. 3, 2003, pp. 307–318., doi:10.1177/0963662503123009.

WORKS CITED CONTINUED

- Forster, Eve. “As a Woman in Science, I Need to Conceal My Femininity to Be Taken Seriously.” *Vox, Vox*, 4 May 2017, www.vox.com/first-person/2017/5/4/15536932/women-stem-science-feminism.
- Freydkin, Donna. “Denise Richards: Bond Showed Me the 'World'.” *USA Today*, Gannett Satellite Information Network, 7 Nov. 2012, www.usatoday.com/story/life/people/2012/11/06/denise-richards-james-bond/1685751/
- Gallardo C, Ximena, and C. Jason Smith. *Alien Woman: the Making of Lt. Ellen Ripley*. Continuum, 2006.
- Halpern, Diane F., et al. “The Science of Sex Differences in Science and Mathematics.” *Psychological Science in the Public Interest*, vol. 8, no. 1, 2007, pp. 1–51., doi:10.1111/j.1529-1006.2007.00032.x.
- Harari, Yuval Noah. *Sapiens*. Random House UK, 2017.
- Hill, Mike. “Spielberg’s Subtext- Jurassic Park.” THU Gathering Berlin. Trojan Horse was a Unicorn, Apr. 2016, Berlin.
- Jutton, Lee. “The World Is Not Enough and the ‘Believability’ of Dr. Christmas Jones.” *Medium*, Medium, 1 Aug. 2016 medium.com/@leiladaisyj/the-world-is-not-enough-and-the-believability-of-dr-christmas-jones-c8524993c0d1
- Land of Plenty: Diversity as America's Competitive Edge in Science, Engineering and Technology*. Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development, 2000
- Mason, Mary Ann, et al. *Do Babies Matter?: Gender and Family in the Ivory Tower*. Rutgers University Press, 2013. *JSTOR*, www.jstor.org/stable/j.ctt5hj7tp.
- McKinney, Kelsey. “Hollywood's Devastating Gender Divide, Explained.” *Vox, Vox*, 26 Jan. 2015, www.vox.com/2015/1/26/7874295/gender-hollywood.
- Miller, Geoffrey. *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature*. Vintage, 2001.
- Murdock, Maureen. “The Heroine's Journey.” *Encyclopedia of Psychology and Religion*, 13 May 2016.

WORKS CITED CONTINUED

- Neuendorf, Kimberly A., et al. "Shaken and Stirred: A Content Analysis of Women's Portrayals in James Bond Films." *Sex Roles*, vol. 62, no. 11-12, 2009, pp. 747–761., doi:10.1007/s11199-009-9644-2.
- O'Bannon, Dan. *Alien*. Twentieth Century Fox Home Entertainment, 1979.
- Park, Lora E., et al. "Effects of Everyday Romantic Goal Pursuit on Women's Attitudes Toward Math and Science." *Personality and Social Psychology Bulletin*, vol. 37, no. 9, Sept. 2011, pp. 1259–1273, doi:10.1177/0146167211408436.
- Patterson, William H. "Alien Woman: The Making of Lt. Ellen Ripley." *The Journal of Popular Culture*, vol. 39, no. 3, 2006, pp. 511–512.
- Rich, Joshua. "Countdown: The 10 Worst Bond Girls." EW.com, EW.com, 2006, ew.com/article/2006/11/13/countdown-10-worst-bond-girls/.
- Shipman, Claire, and Katty Kay. "The Confidence Gap." *The Atlantic*, Atlantic Media Company, 26 Aug. 2015, www.theatlantic.com/magazine/archive/2014/05/the-confidence-gap/359815/.
- Shrum, L J. "Media Consumption and Perceptions of Social Reality: Effects and Underlying Processes." *Media Effects. Advances in Theory and Research*, edited by Jennings Bryant, Lawrence Erlbaum Associates, 2002, pp. 69–96.
- Smith, Stacy L, et al. *Gender Inequality in 500 Popular Films: Examining On-Screen Portrayals and Behind-the-Scenes Employment Patterns in Motion Pictures Released between 2007-2012*. Annenberg School for Communication & Journalism, 2013
annenberg.usc.edu/sites/default/files/MDSCI_Gender_Inequality_in_500_Popular_Films_-_Smith_2013.pdf
- Smith, Laura. "Hollywood Was Exploring Sexuality, Gender, and Feminism in the 1930s-but One Man Stopped It." *Timeline*, Medium, 17 Aug. 2017, timeline.com/hollywood-hays-code-breen-5f7872604f7b.
- Steinke, Jocelyn. "Portrayals of Female Scientists in the Mass Media." *The International Encyclopedia of Media Studies*, III,2013,doi:10.1002/9781444361506.wbiems070.
- Shelton, Donald E. "'The CSI Effect': Does It Really Exist?" *National Institute of Justice Journal*, vol. 259, 2008, pp. 1–7. www.nij.gov/journals/259/pages/csi-effect.aspx
- Tintori, Antonio. "The Most Common Stereotypes about Science and Scientists: What Scholars Know." *Turn on the Light on Science*, Ubiquity Press, 2017, pp. 1–18. doi.org/10.5334/bba.b

UNESCO Institute for Statistics. “Fact Sheet No. 51: Women in Science.” Fact Sheet. UNESCO, 2018, pp. 1–4. uis.unesco.org/sites/default/files/documents/fs51-women-in-science-2018-en.pdf.

FILMS CITED

- Boal, Mike. *The Hurt Locker*. Summit Entertainment, 2008
- Cameron, James. *Aliens*. Twentieth Century Fox Home Entertainment, 1986.
- Condon, Bill. *Kinsey*. Fox Searchlight Pictures, 2004.
- Cuarón Alfonso, et al. *Gravity*. Warner Bros. Pictures, 2013.
- Crichton, Michael. *Jurassic Park*. Universal, 1993.
- Del Toro, Guillermo. *The Shape of Water*. Fox Searchlight Pictures, 2017
- Garland, Alex. *Annihilation*. Paramount, 2018.
- Goldsman, Akiva. *A Beautiful Mind*. Universal Pictures, 2001.
- Goulding, Edmund. *The Flame Within*. Metro-Goldwyn-Mayer, 1935.
- Green, Raf. *Genius*. Season 1: Einstein, Episode 5. National Geographic, 2017.
- Haggis, Paul et al. *Crash*. Lionsgate Films, 2004.
- Hazanavicius, Michel. *The Artist*. Warner Bros, 2011
- Heisserer, Eric. *Arrival*. Paramount Pictures, 2016.
- Jenkins, Barry. *Moonlight*. A24, 2016
- O'Bannon, Daniel. *Alien3*. Twentieth Century Fox Home Entertainment, 1992
- March, Joseph Moncure. *Woman Doctor*. Republic Pictures, 1939.
- Miller, Ashley Edward, et al. *Thor*. Paramount Pictures, 2011.
- Minghella, Anthony. *The English Patient*. Miramax Films. 1996.
- Osborn, Paul et al. *Madame Curie*. Metro-Goldwyn-Mayer, 1943.
- Ridley, John. *12 Years a Slave*. Fox Searchlight Pictures. 2013.

FILMS CITED CONTINUED

Scott, Ridley. *Alien*. Twentieth Century Fox Home Entertainment, 1979.

Seidler, David. *The King's Speech*. Momentum Pictures, 2010.

Tally, Ted. *The Silence of the Lambs*. Orion Pictures, 1991.