More Than Digital Makeup:
The Visual Effects Industry as Hollywood Diaspora

By Sarah K. Hellström
If I hear one more person who comes up to me and complains about [how]’computer-music has no soul’ then I will go furious, you know. ‘Cause of course the computer is just a tool. And if there is no soul in computer-music then it's because nobody put it there and that's not the computers role, it's the role of the songwriter. He puts down his soul in the song if he wants to. A guitar will never write a song and a computer will never write a song, these are just tools.¹

- Björk
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Abstract

This thesis assesses the marginal field (niche unit) of visual effects while taking into account visible and invisible vfx in virtual and actual geographies in Hollywood movies as part of industry-level studies, all the while seeking to bridge the gap between traditional, theoretical approaches of cinema studies and practitioner experience in the context of production culture. The focus of this essay remains on the many temporal aspects of production processes that identify vfx film production as chief, and vfx for television as subsequential. Encouraging scholars to consider a previously limited and repeatedly mislabeled area by demonstrating the pandemic presence of effects and its workers as a form of Hollywood diaspora, this thesis also seeks to demonstrate the need for involvement by means of scholar-practitioner methodologies.

Keywords

Film industry, visual effects (vfx), the performing body, Hollywood diaspora, production culture, 3D animation, motion and performance capture, technology, hierarchy.
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1 Björk interview on ZTV, Swedish television, 1995.
1. Introduction

Background

Fighting a long and complicated history of mutual disbelief and misunderstandings, establishing a harmonious relationship to film industry practitioners is of absolute importance for scholars of media and production studies. John Caldwell welcomes that “[s]cholars should look beyond the standard split between film ‘theory’ and film ‘work’, and consider how film industrial practices, technologies, discourses, and interactions also involve critical analysis, theoretical elaboration, and aesthetic sense making”\textsuperscript{1}. Caldwell’s set terms of industrial self-theorizing suggests that although theorizing \textit{in practice}, practitioners lack something in their methodology which in turn present complications; however, implementations and benefits of “scholars who pursue industry fieldwork at the same time [as] they maintain production identities”\textsuperscript{2} may offer a different insight through scholar-practitioner methodology, as implemented through the eye of the practitioner subsequently engaging in academic research.

Thus, the area of study of this thesis emerged from my decade-long domestic and international background as a film industry practitioner, fueled by a personal interest in the continued reimagining of cinema with regard to artistry and technology in the pursuit to understand the complexities that temporalities of production evoke. Having begun my career in production working primarily as a 1\textsuperscript{st} assistant director and editor, I moved on to production managing commercials and films before I started working in the vfx industry as a coordinator and line producer. The vfx portion of my practitioner experience started at Filmgate in Göteborg, a small boutique company that solely provides high-end vfx to feature films. Vfx credits include \textit{Arn: The Kingdom at the End of the Road} (AB Svensk Filminindustri, 2008), \textit{The Girl With The Dragon Tattoo} (\textit{Män Som Hatar Kvinnor}, Yellow Bird Films, 2009), \textit{Mammoth} (Lukas Moodysson, 2009) and \textit{Kenny Begins} (S/S Fladen Film, 2009) to name a few. A couple of years followed in Soho, London at Double Negative\textsuperscript{3}, which was founded as a boutique vfx company in 1998 and has since grown to become the

\textsuperscript{3} Double Negative is commonly shortened as Dneg [pronounced “dee-neg”].
largest vfx facility in Europe⁴. Its main offices are located in Fitzrovia in central London, and the company also has a subsidiary office in Singapore. When I started working there in 2009, there were some 520 employees on staff: a number that nearly doubled in the following two years. At Dneg I worked on *Kick-Ass* (Matthew Vaughn, 2010), *Iron Man 2* (Jon Favreau, 2010) and *John Carter* (Andrew Stanton, 2012), and I spent a few months of line producing *Hugo* (Martin Scorsese, 2011) for Pixomondo’s now closed London-office. Sections on terminology and vfx production expressly draw upon my own experiences.

This essay surveys and discusses part of the apparatus behind motion capture, performance capture, 3D animation, vfx and the departments they represent, as key and diegetic elements of Hollywood movies today. The purpose of this study is to show through a selection of vital examples how permeated films are with vfx. Seeing that most of Hollywood has become dependent upon vfx; and, that in some cases, films that would never have been made previously are now possible to make through the creation of realistic worlds, creatures and characters, this essay discusses vfx in some of the films that rank amongst the highest grossing films in box offices world wide. Seeking to explore the actual and virtual presence of the vfx community, what it stands for, and where it is headed by means of studying its culture and the art/science behind the effects – this paper can only be considered as the inception of a more comprehensive research project, beyond and above what the content or space of these pages may hold.

**Research Questions**

The overall purpose of this thesis is to approach a lesser-acknowledged field within production studies in the aim to evaluate the international vfx film industry niche as a determining part of Hollywood moviemaking. The research areas below encapsulate the most relevant goals of this study:

- To explore the blurred lines between vfx and live-action and make sense of the extent that the vfx industry contributes collaboratively – with particular respect to CG characters – and to discuss what the artistic vs. technological ramifications may be.
- To survey the virtual and actual geographies of the vfx industry through a closer look at vfx-heavy movies (visible and invisible vfx), and the multi-cultural body that vfx practitioners represent in Hollywood diaspora (or as Chung refers to a kindred metaphor – media heterotopia).
- To begin to understand how temporalities of film industry production processes lay behind the current state of the vfx industry, and the on-going struggles that may divide or bind members of this diverse community together.

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⁴ See http://www.dneg.com/.
Survey of the Field

The task to unravel restrictions of previous research posed a puzzle in its own right in the early stages of my research, and eventually led me to go back to the very beginning of what essentially could be construed as production studies. Leo Rosten said that Hollywood movies have the ability to leave an “impact on individual viewers and society as a whole”5, and the extensive research of Rosten and Hortense Powdermaker within the actual geographical setting of Hollywood, above-the-line workers and mainly the first two of the three main stages of production6, provided a significant methodological legacy to current production studies scholarship. In more recent, and for the purposes of this research, relevant scholarship Dan North’s analysis of the artistic and technological relationship in digital visual effects is paramount to my dissertation. North refers to vfx as “a mistreated and misunderstood field in film studies”7, and North’s own examination of how visual effects have changed Hollywood by interpreting digitally created worlds as substitute realities, is most worthy of evaluation. North and Stephen Prince’s contributions to this marginal field could be the most significant texts to date. Deconstructing the misconstrued and across-the-board use of the term “special effects” when referring to visual effects by noting that the industry dropped the ‘special’ portion of the “Special Visual Effects” category of the Academy Awards in 1972, “making the category Visual Effects”8, Prince provides a long overdue clarification of the persistent mislabeling – a notion that scholar-practitioner Paul Malcolm had identified previously9 working with the VES10.

North’s principal proposal to regard visual effects as intellectually stimulating, proposing three categories ‘of wonder’ that effects may be considered by the spectator: diegetic (visual effects as part of the story), intertextual/comparative (visual effects that improve upon, or re-contextualize effects seen within other narratives) and speculative (“the viewer is invited to imagine how illusory technologies will be deployed in future films or

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6 The three stages of film production being pre-production, production, and post-production.
sometimes in the real world”) are concepts part of the theoretical framework of this thesis. Furthermore, important to advancement of research in the field, is the recent scholarly attention given to how landscapes, architecture and geographies of visual effects are key parts of storytelling (Woodward, Kourelis). Traditional cinema scholars can hopefully examine this assessment within the cinematic worlds further, but there is yet more ground to be covered in the context of visual effects and its globalized industry and one such feat would be to bridge the classic theoretical approach of film studies with production studies methodology. “The significance of place, of the geographies – both virtual and actual – of communities and identities on a globalized world, questions of location have become increasingly significant to media studies”, and I see globalization as permitted through the vfx industry raising questions of identity, place and geography as highly relevant, not only to media production but to media production scholarship. The recent work by Hye Jean Chung advances the layers of compositing as metaphor; evident of temporalities of production, and in doing so I believe Chung adds another valuable dimension worth pursuing.

Many scholars have expressed skepticism toward the spectacle of CG and even considered vfx as enemies of serious filmmaking, reluctant to accept any aesthetic, political, social and cultural content these films may offer – contexts otherwise inherent to discourses that cinema scholars engage in. Some have contributed to the works of Dan North and others by moving past the technology and reading between the lines of, and beyond the spectacle of visual effects, elaborating on the onset of the virtual actor/the computer-generated performing body, its implications and connection to realism in cinema today (Thompson, Gunning, Allison). Crediting practical experiences as the beginning of academic inquiry, practitioner knowledge as defined by John Caldwell may have been capable of guiding this study “beyond the sometimes rudimentary questions that scholars with little direct knowledge of film/television raise”, and takes its cue from practitioner empiricism that may in later studies unearth fundamental differences between dissimilar subcultures of the different stages of production. Scholar-practitioner Erin Hill worked with directors, writers and producers on high-end film and television companies as their assistant, earning the trust of the very subjects she studied while achieving a PhD in Cinema and Media Studies at UCLA. Hill brings up the

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recurring issue of translating scholarly methodologies to perceptive and appropriate behaviors when dealing with practitioners and production. She explains that lacking access previously, the complexity of production processes have limited scholars to interpret courses of action “in the same way one would interpret the meaning of a text.”15 That said, the scholar-practitioner does face other challenges than for example the traditional anthropologist, and certain delimitations of this study are compulsory, as noted by Caldwell. Problems and limitations of this approach may indeed force the scholar-practitioner to “negotiate both their access and their critical distance from those granting access.”16 Thus, a complex relation to subjects being researched and possible subsequential challenges in critically interpreting data are conceivable delimitations of this study.

To convey its main areas of interest, this thesis has consulted a selection of representations of visual effects in Hollywood movies. Work by James Cameron and Peter Jackson exemplifies visual vfx in CG-heavy movies that employ mocap techniques, 3D animation for main characters, and complex vfx. To illustrate more of a range, the subchapter A Departure From Genre goes a little deeper into a few exemplifications of distinct categories of invisible vfx. In order to investigate more of the scope of integration and to observe what is achievable through environments and virtual bodies, the essay discusses examples from Batman Begins (Christopher Nolan, 2005), War Horse (Steven Spielberg, 2011) and Skyfall (Sam Mendes, 2012), with additional comments on the subtlest of invisible effects in Black Swan (Darren Aronofsky, 2010). Via international vfx companies located outside of the physical place of Hollywood, first and foremost through Double Negative (UK) and Weta Digital (NZ), I have sought the counsel of trade stories collected from industry sources through interviews with three primary vfx practitioners: Mathias Larserud, a senior vfx artist currently employed at Weta Digital in Wellington, NZ since 2009, with a background at Filmgate in Sweden, and Cinesite in London; Steve Aplin, current Creative Head of Animation at Double Negative, London, after a 13-year run at ILM in San Francisco; and Simon Kay, Motion Capture Supervisor at Double Negative, who comes from a background in the game industry. Other practitioner sources were consulted through articles, behind-the-scene videos, and written material in relevant media articles in addition to scholarly texts. The first chapter covers the illusion of vfx, the performing body (literally and metaphorically speaking) in virtual realities, Andy Serkis, and the imagined and actual geographies of Peter Jackson and James Cameron’s vfx-heavy filmmaking. The following chapter continues into

16 Ibid., 214.
vfx production processes, temporalities of technology and artistry, a survey of selected vfx films, and an analysis of the vfx community as it stands today.

**Approach and Terminology**

Since the late 90s, CG and vfx-heavy movies have dominated mainstream Hollywood cinema and box offices worldwide\(^{17}\) but the tools that filmmakers and practitioners use to create movies have always been and still are tools that require human, manual operation, regardless of the level of their technological intricacy or sophistication. Educated concern within the marginal field of visual effects field bears significance in a larger context: in spite of vfx-driven movies successes, vfx companies and their laborers are arguably at present in a state of emergency. The works of Timothy Havens and other media texts have shown that production scholars, including Caldwell and others, refer to the industry at large as “film/television”, bundling the two together. This approach complicates detailed studies of the vfx industry. Production studies as a field have been more advanced within, and concerned with television rather than film, and I disagree with relying on the notion that both industries share the same production networks as the stepping-stone for deeper reflections on subcultural aspects. Due to [factual] technical aspects of the media, the vastly varying temporalities of production, a separation between the two ought to be made when attempting to make a closer analysis of production cultures – and to formulate better terms in order “to describe and explain new and emerging production practices that have not been adequately theorized (or in some cases recognized)”\(^{18}\). That said, this essay is by no means an attempt of covering a comprehensive approach to vfx in cinema, nor is it capable of drawing encompassing conclusions regarding the film industry, but it seeks to induce new territory within the field of production studies by its recognition of the visual effects industry as a subculture of its own: an entity dispersed globally per definition of its own nature, albeit constantly connected to Hollywood and therefore a chief representative of its contemporary diaspora.

*Visual effects* (vfx) are created digitally in postproduction outside of the set. They are integrated with live action footage and may include everything from painting out unwanted artifacts or items in frame, to creating elaborate landscapes or 3D animated creatures and characters. In this essay I will employ the term’s industry appropriate abbreviation, vfx.


Special effects are shot in-camera encompassing staged events such as explosions, fire, smoke, wind, fog, rain, prosthetics and special makeup effects. It may be appropriate to mention the term special effects in this essay in contexts that includes the joint efforts of a special effects and a visual effects team. One example is the face-changing scene with Bilbo Baggins, as portrayed by Ian Holm in *The Lord of the Rings: The Fellowship of the Ring* (Peter Jackson, 2001). A dummy that looked like the scary version of Bilbo (Fig. 1) was built by the special makeup effects team, filmed in-camera and morphed with a digital replica of Holm’s face, creating the illusion that Bilbo’s face turns into a monstrous one for a split second (Fig. 2).

**Fig. 1.** Ian Holm with the special effects dummy used in combination with vfx to create Bilbo's scary face-change. (still photo from: http://imgur.com/gallery/1HS8Y).

**Fig. 2.** Bilbo Baggins’ face-change in *The Lord of the Rings: The Fellowship of the Ring* (still photo from: http://oneringfans.blogspot.com/2013/02/frodo-golum-ized.html).

CGI or CG refers to computer generated imagery, and computer graphics. This text applies the abbreviation CG, which will be used interchangeably. Complications associated with using the term computer “generated” imagery, implying that images are “automated” or ruled by technology and machinery, presents the most substantial reasoning behind dropping the “I”. *Motion capture* and *performance capture* represent the technology of mapping and tracking motions and actions performed by an actor using markers, and transferring those actions into the computer. Performance capture specifically defines the capturing of face motions and emotional expressions. The two main categories of vfx practitioners can be separated as vfx artists or production, the former inclusive of all levels of 2D and 3D artists, the latter encompassing individuals working in any level of organizational management, ranging top to bottom from production assistants, to coordinators, line producers, producers and executive producers: vfx workers encompassing both classifications.
2. Creating the Illusion

The film industry at large downplays the role of vfx in movies for the benefit of realism, as Quentin Tarantino said of The Matrix Reloaded (Andy and Lana Wachowski, 2003), “[M]y guys are all real. There’s no computer fucking around. I’m sick to death of all that shit.”¹⁹ A recent scholarly study within the field of visual effects deems “scholarly thinking about cinema […] relatively slow to grasp the important and myriad roles that visual effects perform beyond those associated with spectacle”²⁰, while this thesis regards visual effects not as “a peripheral element of cinema but a core feature, essential to its operation as a narrative medium”²¹. Dan North suggests the exploration of “the development of filmed illusions in order to show how the influence or interfere with the spectator’s reception of visual information.”²² This thesis avoids North’s deeper investigation into illusion/realism, yet supports North’s belief that the illusion has to be convincing, not least when speaking of visual effects and CG characters.

The use of mocap has been an accepted and vital part of the game industry in creating realistic character animations for FPS-games²³, war/military games, adventure and action RPG (roleplaying games) such as Skyrim, Mass Effect and Dragon Age, and so on and so forth. Mocap has also been used in the film industry for years by pre-visualization studios. The extents of motion capture, or rather performance capture, used for supporting or lead characters in movies however is fairly new and have not always proven successful. During the noughties, mocap and performance capture spread like wildfire, set off by live action-imitation The Polar Express (Robert Zemeckis, 2004) – a debatable success continued by Beowulf (Robert Zemeckis, 2007). The mocap and CG-animated feature The Polar Express, widely accepted as a technological marvel at the time, saw performance capture characters (many performed by star Tom Hanks) received by many as creepy and nightmarish. Some critics even compared the human characters to zombies²⁴. The inefficiency of translating

²¹ Ibid.
²² Dan North, Performing Illusions, 2.
²³ FPS is the gaming industry abbreviation for “first person shooter” games, generally employed in war and action games and featuring the shooter/gamer’s point-of-view.
mocap to human characters in *The Polar Express*, and the perhaps “somewhat less creepy”\textsuperscript{25} feat in *Beowulf*, both illustrate the uncanny valley hypothesis\textsuperscript{26} and offer the wonder of speculative visual effects. The hypothesis was formed by roboticist Masahiro Mori who proposed that “when stimuli are defined by a near-perfect resemblance to humans they cause people to experience greater negative effect relative to when they have perfect human likeness or little to no [human likeness].”\textsuperscript{27} In relation to the questionable cinematic attempts to recreate human CG-characters in *The Polar Express* and *Beowulf*, there is something about their faces that just is ‘not quite right’ as the delicacy with which animated human faces has to be treated is crucial, or as Ed Catmull, president of Walt Disney Animation puts it, “we want things to be not quite perfect, have a lot of subtlety, but if they’re too imperfect, then we think that they’re strange.”\textsuperscript{28}

The highest grossing films in Hollywood for the past few years, some which are mentioned in this essay, simply could not have been made without the level of integration in movies that vfx are capable of today. The top 50 highest grossing films all time, *Avatar* (James Cameron, 2009) being number one, shows that 33 clearly CG-heavy and vfx-driven films dominate the worldwide grosses, including all eight Harry Potter films in the top 40, the *LOTR* trilogy occupying the 6\textsuperscript{th}, 23\textsuperscript{rd} and 31\textsuperscript{st} spots, the *Pirates of the Caribbean: Dead Man’s Chest* (Gore Verbinski, 2006) is the 9\textsuperscript{th} highest grossing film, *Pirates of the Caribbean: On Stranger Tides* (Rob Marshall, 2011) is the 11\textsuperscript{th}, and *Pirates of the Caribbean: At World’s End* (Gore Verbinski, 2007) in place 18, qualifies three films of four in the series within the top 20; moreover, super hero films *The Avengers* (Joss Whedon, 2012) places third, *The Dark Knight* (Christopher Nolan, 2008) is in 15\textsuperscript{th} place and *The Dark Knight Rises* (Christopher Nolan, 2012) at number eight, while the reboot *The Amazing Spiderman* (Columbia Pictures, 2012) comes in on place 48.\textsuperscript{29} Additionally, eight of the other top 50 movies are full CG animation films, including the three last films of the *Shrek* quadrology.\textsuperscript{30}


\textsuperscript{28} Dan North, *Performing Illusions*, 152.

\textsuperscript{29} Box Office Mojo, All Time Box Office worldwide grosses., http://boxofficemojo.com/alltime/world/

\textsuperscript{30} Ibid.
Outside of the fantasy-adventure and science fiction genres, other films are now able to present characters and creatures or worlds as realistic elements of the story, not previously achievable without vfx. *Life of Pi* (Ang Lee, 2012) is but one example, featuring a seemingly real tiger at the helm of the larger portion of the film. As part of the illusion of vfx and CG characters remains the ideology of traditional animation: to convey not only actions or motions, but in the context of characters, communicate true emotions and as Walt Disney said, “the feelings of those characters.” Numerous CG characters show that this is possible with today’s technology, imagined through temporalities of vfx production.

**The Performing Body**

A diegetic and sensible use of visual effects does not only pertain to regulations of the spectacular, but may also lie in the choices of when *not* to use them, as scholar Jerry Mosher shows in his essay on the morphing of Sean Austin. Having focused his research to body representations in cinema, Mosher ascertains the depth of *LOTR* through the substance of Austin’s weight gain, demonstrating the “bodily sacrifice that distinguishes these films and their live action from seemingly effortless (and heartless) digital animation.” In contrast, the marginalization of animation in today’s collaborative CG performances has been judged “one of the great scandals in film history” by film culture scholar Tom Gunning, yet it is the heart of a performance (not limited to a physical body) that makes a character authentic and subsequently delivers the illusion as believable. It is not surprising that collaborative digital performances are subsequently overlooked considering “the marginal status that animation itself occupies in film theory and aesthetics”; but, when animation delivers characters from *Dumbo* to Woody in *Toy Story* (John Lasseter, 1995) and Wall-E, the impact that these characters have on the audience can be argued as equally convincing and captivating as any live action performance. The 3D-animated, non-human and speechless character of Wall-E

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34 Ibid.

(Fig. 3) described in one review as “the most sympathetic, lovable robot ever created on film”\(^\text{36}\), moved audiences to tears. The power of animation through the process of bringing life to inanimate objects depends on the processes that embody specific skills and abilities of animators capable of translating movement of a character – humanoid, monstrous, animalistic, or fantastical – into the very essence of its being: an emotionally relatable illusion. A breakdown of mocap technologies begins the discussion on the performing body in the literal meaning, and transitions into a closer survey of CG performances. Later chapters are intended to reflect ‘the performing body’ as metaphor of vfx as a collective narrative, or diegetic visual effects.

Motion capture relies on advanced technology to capture the movements of a performer and translate these movements to the computer. The verbatim definition of motion capture is described as “measuring and object’s position and orientation in physical space, then recording that information in a computer-usable form. Objects of interest include human and non-human bodies, facial expressions, camera or light positions, and other elements in a scene”\(^\text{37}\). Scott Dyer’s comprehensive, nearly two decades old ‘white paper’ on motion capture, defines the two main systems as magnetic and optical\(^\text{38}\), how they are setup, their advantages, and disadvantages. Motion capture supervisor Simon Kay clarifies in an interview that while magnetic systems are hardly used anymore, as they were never very good and posed a health risk, optical systems are the most common today\(^\text{39}\). Nearly twenty years after Dyer’s report, other systems known as inertial systems that use gyroscopes\(^\text{40}\), and the lesser used mechanical motion that use an exo skeleton/armature setup\(^\text{41}\) have entered the market. Kay says of the most frequently used optical systems that “there are slight differences in [them] but they are essentially the same: identifying tracking point; track point in 3D space”\(^\text{42}\), describing that whereas there are varying passive (reflective shiny balls) and active (glowing balls) optical techniques, optical mocap systems still innately operate on


\(^\text{38}\) Ibid.

\(^\text{39}\) Simon Kay, email to the author, April 22, 2013.

\(^\text{40}\) See Xsens MVN, inertial motion capture system website for more in-depth technical information. http://www.xsens.com/en/general/mvn

\(^\text{41}\) Meta Motion, Gypsy 7 motion capture system website. http://www.metamotion.com/gypsy/gypsy-motion-capture-system.htm

\(^\text{42}\) Simon Kay, email to the author, April 11, 2013.
similar assumptions. Concerning the choice of system, Kay explains that budget and the specific needs of any given performance capture are determining as “[o]ptical requires cameras and special suits whereas inertial suits can be hidden under clothes and don't require external cameras. Inertial is comparatively cheaper to high-end optical systems but there are good mid-level optical systems like Optitrack\textsuperscript{43} which companies are beginning to adopt”\textsuperscript{44}.

Andrew Stanton’s \textit{John Carter} used inertial mocap much thanks to the benefits of it not “being tied to a mocap studio, but allows [...] the flexibility to capture performances literally anywhere”\textsuperscript{45}, partially shot on-location in real-live action environments such as remote locations in Utah\textsuperscript{46}. Mocap and performance capture data from the film shoot was usable as the basis of animation for the Martian creatures and CG characters. Performances not restricted to lead characters included crowds, and a great deal of additional mocap data captured by Kay and the animation team at Dneg was used predominantly for crowd scenes. A specific system called “Mob” was developed for large crowd scenes, while “foreground characters were always keyframed”\textsuperscript{47}. Mocap data was also used as reference material, specifically for lip sync for the animators working on the speaking alien characters, illustrating the scope of uses of mocap and performance data not only literal but as reference material.

\textbf{The Curious Case of Andy Serkis}

Film and Media studies scholar Tanine Allison denotes the character of Gollum as “one of the most memorable and emotionally complex computer-generated characters to date”\textsuperscript{48}, subsequently considering motion capture as digital indexicality, and judging the amalgam not

\textsuperscript{43} See OptiTrack website for information on this particular optical mocap system: http://www.naturalpoint.com/optitrack/about/customers/luma-pictures.html
\textsuperscript{44} Simon Kay, email to the author, April 22, 2013.
\textsuperscript{48} Tanine Allison, “More Than a Man In a Monkey Suit: Andy Serkis, Motion Capture, and Digital Realism”, in \textit{Quarterly Review of Film and Video}, 28 (Taylor & Francis Group, LLC, 2011), 325.
as paradoxical, but reflective of “the heterogeneity of digital visual culture”\(^{49}\). Coincidentally, the most famous character of Andy Serkis’, Gollum, may be noted on in the context of the character’s accidental or premeditated resemblance of its name to Golem of the Old Testament, a word that probably meant “unformed, amorphous” or according to Moshe Idel, professor of Jewish Thought, “embryo”\(^{50}\). Gollum on the other hand, depicts a humanoid character that goes through a de-evolution, yet both notions deal with the concept of transformation and can be symbolically translated to the amalgam of collective aspects that Gollum the CG character indeed entails. In turn, although transformation is at the heart of the character, Gollum in many ways also symbolizes incompleteness and noncompletion – in line with the ongoing unfolding of the virtual actor. Following Zoe Saldana’s celebrated performance in \textit{Avatar}, Serkis’ determined call for the recognition of motion capture performances, embodied through his own rendition of Gollum, was put on display through a number of articles. While some members from the acting community publicly supported Serkis, including James Franco who even wrote a column in Serkis’ defense in the run for an Oscar\(^{51}\), such claims were soon challenged by the disgruntled choir of vfx practitioners and produced a tear in the digital membrane. It was during a BBC interview in 2011 that Serkis first expressed his dismay over the lack of respect and acknowledgment he receives proclaiming, “It should be recognized that there are two parts to the process. The first part is capturing the performance. Only later down the line do you start seeing the characters being painted over frame by frame using pixels.”\(^{52}\) Serkis had made a quite controversial statement that created uproar within the vfx and animation communities, not least among animators, but also amidst production workers and other artists working within the vfx industry.

According to Andy Serkis, some purists think performance-capture acting is not equal to ‘the real thing’ and he disagrees to this notion by stating that “[a]cting is acting, it’s really a matter of how the character is clothed and made up. One is before the fact, and one is after

\(^{49}\) Tanine Allison, “More Than a Man In a Monkey Suit: Andy Serkis, Motion Capture, and Digital Realism”, 326.


the fact.” Whether Serkis chose to simplify the processes behind creating a CG character based on his performance consciously in order to promote his efforts as a marginalized actor, or whether he simply lacks the insight remains uncertain. However, Serkis’ own book canvassing the creation of the character Gollum contradicts the latter notion, and more voices were making themselves heard in the media. Film journalist Bill Desowitz, who specializes in animation, VFX and technology, reported that “only about a quarter of Kong’s facial animation was performed by Serkis, but the insinuation of human agency is an important factor in selling Kong as a creature not computation.” Moreover, Katy Steinmetz ensured that “a typical costume-and-makeup regimen is not nearly as elaborate as the techniques behind the digital characters in The Hobbit,” nor should they be compared with the same measuring tools, because “[for] Tolkien beings like Gollum, motion capture without a talented animator is like a soul without a body.” Motion capture supervisor Simon Kay supports the notion of any CG performance as a cooperative exertion through his lens of technical motion capture expertise, by asserting that “[m]uch of the initial performance may come from the performer but there will be some enhancement of that performance by an animator,” adding that “[i]n some case this may be a simple enhancement of the original performance and in others it might be a complete rework of it leaving nothing of the original performance. I think this means its always going to be a collaborative effort.” At the same time, one San Francisco Chronicle writer deliberates whether Serkis is a “victim of mocap discrimination” as he has yet to receive an Academy Award, a standpoint that has received wide support. If efforts of vfx team are currently being overlooked, this does not however automatically lessen the notion that Serkis may be an Oscar-worthy actor; that said, the

55 Dan North, Performing Illusions, 180.
57 Ibid.
58 Simon Kay, interviewed by author.
59 Ibid.
collision between the opinions of supporters of ‘real’ performances and vfx industry defenders is no doubt unfortunate, and disadvantageous to vfx industry practitioners.

From a production aspect, those who study vfx production processes must also remember that “since everything can be changed after the recoding, lots of stuff are changed. The difference from filming an actor is that after the shot is done, you are stuck with what you have.”61 Adding that “[w]ith motion capture you are able to change stuff easier and most of the time, depending on being able to change it”62, vfx artist Mathias Larserud aptly denotes one of the new dimensions that vfx solutions entail. The option to keep changing a shot certainly adds another layer to the temporalities of vfx production, but possibilities may also create problems that did not exist before, relatable to both budget and time restrictions. Consideration to the limitations of motion capture in direct relationship to the level of accuracy that motion can be transferred to a CG character, is abridged by Creative Head of Animation, Steve Aplin:

> There is a loss of weight which occurs with motion capture, largely because it works with fixed bone lengths and is unable to capture secondary motion such as joint compression, muscle flexing/relaxing and the effect of gravity and force on muscle, fat and skin. These are key ingredients to selling the physical motion of a character. If a VFX house doesn't have a viable muscle/skin solution, then the animator will have to layer an approximation of the effect on top of the motion capture data.63

In *LOTR*, the aspect of creating facial animation for a living, man-like being such as Gollum was important in making him ‘authentic’ even outside of Serkis’ performance. After the transfer of mocap data proved insufficient, Gollum’s face was done “entirely by key frame animation”64 and employing mocap technology in conjunction with 3D animation for featured characters continue to blur the lines between illusion and reality. The final section of this chapter centers on outstanding work by Peter Jackson and James Cameron in films that feature visual effects and thus further reflect the actual and virtual geographies and subcultures of the vfx industry.

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61 Mathias Larserud, interviewed by author.
62 Ibid.
63 Steve Aplin, interviewed by author.
64 Tom Gunning, “Gollum and Golem: Special Effects and the Technology of Artificial Bodies”, 347.
From Avatar, and Back Again to Middle Earth

Australian classical studies, archaeology and media studies scholar Jane Landman asserts that “[f]ilm production has always depended on geographical substitution, but the current mobility of production represents both an extension of and a shift from earlier practices”\textsuperscript{65}. The film industry today is indeed a geographical extension of ‘Hollywood’ that goes way beyond the physical space of Hollywood, Los Angeles, relying on pan-national production companies and subsidized shooting locations or vfx production locations. For example, with the UK offering producers and studios subsidies\textsuperscript{66}, Disney’s live action and simultaneously CG-heavy \textit{John Carter} was largely shot in the UK with the entire body of vfx work produced in London, first and foremost by main vendor Dneg and contributing co-vendors Cinesite and MPC. For \textit{Avatar}, James Cameron chose to go on location shoots in Hawaii and New Zealand\textsuperscript{67}, albeit most of the world of Pandora on screen is created in computers. Likewise, more than ever before the wide use of global vfx companies should attract the attention of media studies and production scholars to the vfx industry for the continued exploration of “the significance of place, of the geographies – both virtual and actual – of communities and identities of a globalized world”\textsuperscript{68}.

One such place of virtual origin worth exploring a bit closer, is the fantastical world of Peter Jackson. Ever since presenting the tumor-ridden aliens in \textit{Bad Taste} (Peter Jackson, 1987), the imaginarium of Jackson has been described in his own words, “Filmmaking for me is always aiming for the imaginary movie and never achieving it.”\textsuperscript{69} The journey that Kiwi Jackson has made so far, navigates across film formats, genres, continents, special to visual effects, and dimensions of the mind. Author Brian Sibley comments on how fascinating the “escalation rate of Weta’s contribution to Peter Jackson movies is […] \textit{The Return of the King}”.

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\textsuperscript{65} Jane Landman, “‘Not in Kansas Anymore’: Transnational Collaboration in Television Science Fiction Production”, in \textit{Production Studies}, 143.
\textsuperscript{68} Jane Landman, “‘Not in Kansas Anymore’: Transnational Collaboration in Television Science Fiction Production”, in \textit{Production Studies}, 154.
\end{flushright}
in 2003 would contain a staggering 1,691 special effects shots (which was double the number in The Two Towers). In his acceptance speech at the Oscars in 2004 after beating out the likes of Clint Eastwood, Peter Weir, Sofia Coppola and Fernando Meirelles by winning Best Director award, Jackson concluded that “fantasy is an f-word that hopefully the five-second delay won’t do anything with.” The technology part of it all cannot be ignored. One software developed specifically for LOTR was “Massive” software that took five years to develop by Stephen Regelous in order to literally create ‘massive’ AI-driven crowd and battle scenes, and as a result grew to be adopted by a global representation of vfx studios, including but not limited to “Pixar, Sony Pictures Imageworks, ImageMovers Digital, DreamWorks Animation, Rhythm & Hues, Digital Domain, Framestore CFC and The Mill”, consequently spreading the use of a software as part of international pipelines geographically from Oceania to the Americas and Europe. That said, more technical disciplines part of the vfx industry may still be separated from more artistic disciplines, software development undoubtedly belonging to the former category.

Furthermore, LOTR was a visual spectacle as is no doubt The Hobbit trilogy, but not solely as a result of the vfx elements. Locations were picked based on what “would be most impressive on screen”, adding New Zealand to the realms of Hollywood in the process, the production scouted locations all over Jackson’s home country. Identifying New Zealand as ‘Hollywood Down Under’, Steven Woodward and Kostis Kourelis detect the tension created between “the illusion of unity of space and time” in the film architecture of LOTR, noting that Jackson covers notable ground in the onward motion “toward realizing the potential of cinema’s expanded architecture.” Taking his cue from Tolkien, Jackson paints his canvas with the underground houses of the hobbits, gently tucked into the soft green hills of the Shire’s landscape, and the embedded dwellings of the elves into mountains, forests and trees.

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70 “Special effects shots” ought to be replaced by the correct term “visual effects shots”, author’s note.
76 Ibid., 196.
in Rivendell and Lothlorien, emphasizing the contrast between the natural and the fabrication of built form through the protruding towers of Saruman and Sauron. “Jackson is faithful to a grand theatrical tradition where architecture remains a visual backdrop heightening psychological effect”\(^{77}\), and as such, the external homes that houses good and evil are internalized through the architecture of Middle Earth.

Hollywood diaspora as embodied by vfx practitioners have caused some critics to hold the industry responsible for creating legions of migrant workers, maintaining that “job security [is] nonexistent”\(^{78}\), while others identify opportunities to travel and see the world. While the production of \textit{LOTR} was predominantly local to New Zealand, vfx artists and production workers at Weta Digital where (as in all larger vfx studios) made up by an intercontinental collection of individuals. Visual effects shots were produced by Weta Digital, outsourcing a portion of shots to the California-based, now bankrupt Rhythm & Hues. The migrant vfx artist works on contracts at least 6-12 months long – reminiscent of the historical vagabond existence of the traditional film worker, moving from one film shoot to the next after a couple of months of principal photography. However, the vfx artist is more commonly working on productions much longer than a couple of months, and a complete relocation and sometimes uprooting of one’s family from one continent to another is more often a rule than an exception. A metaphorical connection between journeys made by vfx practitioners is easily drawn to the narrative journey of the fellowship and that of Bilbo’s, and even embedded in the title of the original J.R.R. Tolkien fantasy novel, \textit{The Hobbit: There And Back Again} (George Allen & Unwin, 1937).

The worldwide successes of Peter Jackson are arguably only matched if not superseded by James Cameron. With epic, romantic drama \textit{Titanic} (James Cameron, 1997), Cameron shares the accomplishment of winning 11 Oscars for a single movie with Peter Jackson who matched Cameron’s feat with \textit{The Lord of the Rings: The Return of the King} (Peter Jackson, 2003); \textit{Ben-Hur} (William Wyler, 1959) being the only other film in history that ties their 11-win records\(^{79}\). While Jackson’s \textit{LOTR} introduce fairytale landscapes as imagined by Tolkien, the alien geographies of \textit{Avatar} combines science with artistic vision, much characteristic of Cameron’s own persona. Defining \textit{Avatar} as being made in two ways as only 1/3 was shot through the lens of a camera and 2/3 of the film was shot through a

\(^{79}\) See titles on imdb.com for records of Academy Award wins and nominations.
virtual lens, an entire world was created using CG\textsuperscript{80}. First time production designer Robert Stromberg, who had previously worked as a matte painter and concept artist, initially visualized a figment of Cameron’s imagination: the world of Pandora. Similar to the contrasting environments in \textit{LOTR}, the natural forest of Pandora’s jungle and the military-complex of Hell’s Gate, the latter was physically constructed on sets while according to vfx supervisor Letteri “so many of the sequences became \textit{entirely} CG once you were in the jungle environment”\textsuperscript{81}, making the CG geography presence culminate in \textit{Avatar} after the initial explorations in \textit{LOTR} that grew in number in \textit{King Kong} (Peter Jackson, 2005). Introducing the science of Pandora’s geography, although imagined by Cameron, scientist say the habitable moon of Pandora could exist\textsuperscript{82}. "Alien moons orbiting gas giant planets may be more likely to be habitable than tidally locked Earth-sized planets or super-Earths,”\textsuperscript{83} says Smithsonian astronomer Lisa Kaltenegger, further implying that "[w]e should certainly keep them in mind as we work toward the ultimate goal of finding alien life."\textsuperscript{84}

The significance of ‘returning to something’, as indicated in Jackson’s third and final installment of \textit{The Hobbit: There And Back Again} (Peter Jackson, 2014) could be seen as an allegory of Jackson’s willing return to Skull Island via his remake of \textit{King Kong}. Recognizing what vfx had now made possible during the production of \textit{LOTR}, Jackson said of Kong, “It has been my sustained dream to reinterpret this classic story for a new age.”\textsuperscript{85} His version of the movie could not have been made a decade earlier, but due to the vfx pipeline developed during \textit{LOTR}, Weta Digital was able to “efficiently produce the many hundreds of complicated visual effects shots”\textsuperscript{86}. The geography of Skull Island was in many ways examined in contrast to the vast, diverse scope of locations of New Zealand and virtual environments in \textit{LOTR}. In \textit{King Kong}, Jackson opted not to go on location and largely due to the “masses of gnarled and twisted trees”\textsuperscript{87} of the Skull Island jungle, similarly to the 1933 original, the film was shot on a soundstage. Jackson wanted to show “how you can create believable environments”\textsuperscript{88} by building sets and models and enhancing images “by computer to an extent where a lot of the frame can actually be filled with composite images that you’ve

\textsuperscript{80} \textit{Side by Side}, documentary (Company Films, 2012).
\textsuperscript{82} See Lisa Kaltenegger, “Characterizing Habitable Exo-Moons” (Cambridge, Harvard University, 2009).
\textsuperscript{84} \textit{Ibid.}
\textsuperscript{85} Brian Sibley, \textit{Peter Jackson: A Film-Maker’s Journey}, 521.
\textsuperscript{86} \textit{Ibid.}, 524.
\textsuperscript{87} \textit{Ibid.}, 541.
\textsuperscript{88} \textit{Ibid.}, 542.
put in there after the actors have left the set and gone home”89. Extending the possibilities of virtual geographies beyond the construction of physical sets with vfx, there are many other examples outside those of Jackson and Cameron’s films. A few cases are considered in the last section of next chapter, albeit they represent vfx outside examples from the typical fantasy-adventure and science-fiction genres investigated here.

3. Capturing (e)motions for the Masses

As stated in the beginning of this essay, even though the same or similar digital tools may be applied in order to create visual effects for film and television the differences in temporality are overwhelming as companies, budgets, workflows, resources, size of teams, deadlines, time-constraints, turn-around and production schedules are vastly different. Media studies scholar Felicia D. Henderson comments on the fallacies of previous academic work in particular respect to differences between film and television. Asserting that scholars in the past have applied a “‘film studies’ approach to television”90, Henderson found it frustrating to discover this bundling of the two. Furthermore, many scholars insists on holding onto the “film/television” trope without regard for the comprehensive amount of television that in fact is non-fiction, but rather meticulously timed programming consisting of an endless arrangement of news reports, sporting events, documentary series, reality TV, three-camera sitcoms, live talk shows, music concerts, game shows, political broadcasts, and so on and so forth – that make up an array of productions which inherently employs very different production processes.

While producers and directors are the financial and creative heads, respectively, in film production, in television the writers “now function as the creative heads”91 and therefore media and television scholars have to adjust their approach accordingly. Some separation ought to be made not only in relation to the varying definition of traditional above-the-line roles, but when studying below-the-line workers and not least, the vfx community as part of the film industry. Differences in time regimes is only the basis. In vfx for feature film, lead vendors are in production for several months, often a year or longer, whereas in television vfx

91 Ibid.
teams are familiar with turning around and delivering shots in a matter of days and weeks. For obvious reasons, vfx for film have to be exclusively high-end and produced in the highest resolution possible, as vfx shots are to be projected on large cinema screens worldwide. Movie studios clearly demand only the highest quality of work from the vfx companies, and rightly so. Vfx made for television are made "good enough" for the TV set, bearing in mind that time-constraints and budgets simply do not even allow for a higher quality level, regardless of what specific expertise artists and companies may in theory possess. The production process and quality level that goes into delivering the end product consequently vary considerably between film and television, especially taking into account distinct and varying production temporalities in vfx for film, some of which are discussed in the following subchapter.

**VFX Production Processes**

The bewildering aspect of how the structure of production pipelines and interdepartmental workflows looks is very complicated to break down into one normative bundle, considering that no show\(^2\) is like any another. Artists and production personnel are contracted not to reveal any details of their work, or even what show they are working on. To protect the identity of shows in production, a method that arguably prevents workers a slip of the tongue (which simultaneously allows workers to talk about their work to each other even outside of the office), is the use of ‘cover’ work titles. A show about to commence production is commonly assigned a three- or four-letter abbreviation (written in capitals), which is used in the technological, administrative and creative systems and intercommunication from start to finish within the local company and across borders communicating with the film studio. This is practical but more importantly, the abstraction protects the anonymity of the show. At Dneg, for example, abbreviations can be simple and exact as in the case of *John Carter*, originally titled *John Carter of Mars* and therefore shortened as ‘JCOM’, or in the case of *Kick-Ass* the four-letter abbreviation being simply ‘KICK’. However, shows are often known within the walls of the studio by an undercover alibi that bares little or no resemblance to the original title of the movie.

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\(^2\) The use of the term “show” in reference to feature films is a universal term used by practitioners over in the vfx industry at ILM, Weta Digital, Double Negative, Framestore, MPC, Cinesite, et al.
The key roles of the production team discussed here references production processes at Dneg and may bare a stronger or lesser resemblance to structures at other vfx companies of similar magnitude. Any show has a core production team lead by a producer and a vfx supervisor, and in most cases a line producer and coordinator (sometimes on smaller shows, the line producer may perform tasks in addition to their regular tasks otherwise managed by the coordinator). On larger shows there can be several coordinators and additional production assistants, the latter reporting to coordinators and the line producer. Commonly, even on smaller shows, there are 2D and 3D supervisors overseeing their dimension within shots and reporting to the vfx supervisor, who effectively has the creative responsibility of all vfx work that the facility produces on the show. In some cases, there will be an animation supervisor and on large shows there can be multiple supervisors and additional leads within each subcategory of creative and technical disciplines of the vfx pipeline. Beyond these roles, categories, titles and areas of responsibility are specific to the creative goals of the production, and as such subsequent roles are individual to each show. Additionally, even some of the normative roles can be referred to with alternate titles depending on the vfx facility in question, which further complicates a standardized vocabulary or production overview at this point in time. For example, MPC in London reportedly employs the term ‘production manager’ rather than line producer.

Each department and vfx artist as part of that department is dependent upon each other. Through basic pipeline needs, a lighting TD\textsuperscript{93} may not finish lighting a scene or shot without having been passed on the different layers that make up the scene, such as finalized fx\textsuperscript{94}, modeled environments, animated characters and so on and so forth. In turn, a compositor may not finalize his or her composite (or ‘final comp’, the final version of the shot that gets delivered and ends up in the movie) until the lighting artist has turned over an approved version of his or her lighting. Consequently, vfx practitioners are constantly dependent on an operational pipeline, and daily continual communication with peers, supervisors and managers. Interestingly, the profession of a vfx artist is not only dual in its artistry vs. technology-aspect, but in many ways also dual in its innately solitaire form (sitting in front of a computer screen) in contrary to the never-ending intercommunication with other

\textsuperscript{93}“TD” is short for Technical Director albeit not related to directing in the traditional meaning. For example, it rather may refer to ‘directing’ the lighting and rendering of a scene. There are however many specific areas of expertise inside the general umbrella of a TD or TD generalist, that do not have to involve lighting but alternately may consist of effect TDs (particle and fluid effects such as fire, smoke, snow, moving water, debris, snow and clouds), shader/writers, texture artists, technical animators, modelers, creature fx, cloth fx, etc.

\textsuperscript{94}The abbreviation “fx” is industry standard for ‘effects’, in this case not by any means pertaining to all visual effects but to particle and fluid simulations, as described in the above citation.
members of the vfx team. How fluid the specific workflow is within any production pipeline depends on its nature, size, and scope of vfx shots. Although certain modes of attack are applicable and executed as best possible by production personnel in charge – due to its distinct makeup each show presents varying attributes and in turn, very different challenges.

While there are some general common denominators, structure and workflow methodology starts with the producer as he or she sets and carries the tone throughout the project and thus influencing everyone else working on that production. The producer’s right hand is the line producer, who in short is responsible for managing a detailed scheduling of the show, planning resources, ensuring the team understands milestones and goals, delegating work to coordinators, and filling in for the producer when needed. In turn, the role of the production coordinator may vary decidedly, and the essence of his or her responsibilities are directly related to the nature and complexity of the size of the team and the show. The main responsibility is however to ensure that artists as well as supervisors stay on schedule and deliver short-term goals on time. The ability to operate under a lot of pressure and extremely mentally challenging conditions is key to the role, for example, spending the entire workday in a dark screening room taking real-time notes from the vfx supervisor that can be very technical. A crew managed by any one coordinator can be as large as 100-200 souls, even though the entire crew can be significantly larger – and managing a team that embodies a wide and often technically intricate array of functions can be very convoluted and arduous. Some vfx artists working in visual effects are highly skilled mathematical engineers and computer programmers who have developed computer graphic skills relevant to the industry, for example creating simulations of fluids and particles. Others come from backgrounds as traditional artists, having worked with 2D, hand-drawn and stop-motion animation, illustration, painting, sculpture and modeling, or photography. Thus, the domains of the vfx company are abundant with particular languages and terms specific to each subculture, making it a multi-faceted and ever-evolving place in terms of language and pipeline routine.

On John Carter, the team size and number of departments, many which were at Dneg working on the show exceeded any other show. The animation team alone had over 100 animators working on the over 800 animation shots out of 960 shots for Dneg, making it

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97 Zelda Tinska, Animation Coordinator on John Carter, email to the author, April 25, 2013.
98 Vincent Frei, “John Carter: Peter Chiang – VFX Supervisor & Co-Founder Double Negative”.

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heavily animation-, character- and creature-focused for the company, Dneg shared the total amount of about 1900 vfx shots\textsuperscript{99} with Cinesite and MPC. Furthermore, the temporalities of production can be complex and include time constraints and lengths of production involvement for key members of the production team. When Dneg had been awarded the show, they “started a ‘Proof of Concept’ test to illustrate [their] methodology”\textsuperscript{100} to Disney and the filmmakers. For animation supervisor Steve Aplin, the process began immediately with creating concepts and designs of the tharks (the aliens that make up the lead CG characters in the movie, animated based on motion capture) using traditional sculpts, Photoshop and Zbrush, executing “character animation tests with Tars using excerpts from various Willem Dafoe films and a WIP model/rig”\textsuperscript{101}, then moving on to “developing the other characters in a more supervisor role”\textsuperscript{102}, and attending “‘thark camp’ with the principal actors playing the four thark leads. They learned how to walk on stilts in this time, tried mocap for the first time, starting working out how Tharks might fight, etc.”\textsuperscript{103} Aplin then went on location for principal photography at Shepperton Studios and on location in Utah with Eamonn Butler, with whom Aplin worked alongside as animation co-supervisor. Facial tests followed with new rigs, nine months of back-and-forth with rigging, and mocap shoots for most of the background thark action at Centroid, Pinewood Studios. The show finally culminated in over one year’s work and supervising of animation shots, “reviews with the team and the director, either at Dneg or via Cinesync sessions”\textsuperscript{104}, and by the end of Aplin’s run on \textit{John Carter} he had spent 2.5 years working on JCOM alone.

In order to pull of such a vast scope of CG creature work, Dneg essentially “needed to rewrite [their] creature pipeline and delve into animation on a more serious level”\textsuperscript{105} and as the production progressed, “everything in the creature pipeline was adjusted for shots to come”\textsuperscript{106}, making temporalities of production all the more challenging and unpredictable than usual for everyone on the team. Because the scope of vfx and animation shots was so daunting and the size of the team so great, Pete Chiang, Dneg co-founder and vfx supervisor, and vfx producer Matt Plummer divided the vfx crew into three main units, each headed by a producer and supervisor, and their production teams, delivering their portion of shots to final. A fourth unit was specifically formed for technical and new or revamped creature

\textsuperscript{99} Vincent Frei, “John Carter: Peter Chiang – VFX Supervisor & Co-Founder Double Negative”.
\textsuperscript{100} \textit{Ibid.}
\textsuperscript{101} Steve Aplin, email to author, April 24, 2013.
\textsuperscript{102} \textit{Ibid.}
\textsuperscript{103} \textit{Ibid.}
\textsuperscript{104} \textit{Ibid.}
\textsuperscript{105} Vincent Frei, “John Carter: Peter Chiang – VFX Supervisor & Co-Founder Double Negative”.
\textsuperscript{106} \textit{Ibid.}
departments, such as rigging, technical animation, creature fx (dedicated specifically to muscles, tendons and skin), cloth and fur. One to three line producers managed this fourth unit at any one time, constantly feeding the three main units. Due to the physical anomalies in creatures, the tharks with four arms and the thoats they ride on having eight legs, animating movements as natural and still abiding by the laws of physics, was only one of the challenges that the creature and animation teams faced. The example of *John Carter* as a vfx production process is relevant in the context of what can be imagined for the future of vfx pipelines, a vfx company working on big scale epic features and having to invent both software, tools and processes during the course of production. At Dneg, 850 people worked on the show “at one time or another”\textsuperscript{107}, hinting what may lie in the future also for the temporalities of production.

**Technology vs. Artistry**

“Many contemporary films with computer-generated visual effects display the presence of disjunctive seams between physical effects and computer-generated effects, even as they try to hide the actual points of suture. By unraveling the seams and de-mystifying the process of how these spaces are constructed, I suggest that the stitches holding these layers together can be revealed and recognized.”\textsuperscript{108} -Hye Jean Chung

This subchapter concludes the collaborative, artistic, technological aspects and functions of visual effects by way of introducing James Cameron’s art/science persona, in the aim of grasping the identity of the vfx community, and the virtual geographical environments that it inhabits. Media industry scholar David Hesmondhalgh describes that “[t]he sociological emphasis on complexity and collaboration in production derives from a strong democratic and leveling impulse. It implies that art and entertainment are not the products of special, talented individuals, rather they are the results of social interaction and co-ordination.”\textsuperscript{109} The past has regarded it much easier to speak of artistic values as opposed to scientific aspects as part of media arts and filmmaking. Characterized by writer Rebecca Keegan as a “half scientist, half artist”\textsuperscript{110}, first having majored in physics at Fullerton College, then contributing to underwater filming and later developing ground-breaking technology through the 3D Fusion Camera

\textsuperscript{107} Vincent Frei, “John Carter: Peter Chiang – VFX Supervisor & Co-Founder Double Negative”.
\textsuperscript{110} Mark Milian, “James Biographer Says the ‘Avatar’ Director is Half-Scientist, Half Artist”, *Los Angeles Times*, published online December 11, 2009.
Cameron arguably embodies the contradictory affections of artistry and science to an ‘impossible’ degree and **Avatar** was the perfect opportunity to unite the two through the comprehensive use of high-end vfx, CG environments, mocap and 3D animation. “You have this idea that you can hone in on a mathematically perfect model for creating reality if you just throw enough computing power at it and you just throw enough software at it,” says Cameron of the technology behind **Avatar**. “Guess what we found? Didn’t work. It required the eye of the artist and people who are trained in photography and looking at how light interacted with things to figure out how to write the code, to make it look ‘real’.”

Cameron’s fascinating embodiment of a seemingly equal fusion of the two somewhat contradictory concepts of science and art has not only been expressed through his movies and scientific contributions, but is evident as a significant part of the trajectory of the vfx industry as Cameron co-founded Digital Domain in 1993, coincidentally the same year that Peter Jackson founded Weta Digital. Jackson’s own accord of Cameron’s art/science mind renders the **Avatar** director as “formidable”, and biographer Keegan confirms Cameron’s mind to be “equally developed on both sides — the scientist and the artist.” Having been part of the visual effects team himself on **Galaxy of Terror** (New World Pictures, 1981) twelve years before founding Digital Domain, Cameron understood from the start what it was like to work as a vfx artist. Accordingly, visual effects artist of today, whether experts within 2D or 3D disciplines, combine their individual artistic backgrounds with the technological proficiency required for their professions. James Cameron’s position as a film director is unique in his deeper insight and knowledge of both artistry and science. “For him, science and art are equally necessary parts of what he does,” says biographer Keegan, tracing Cameron’s interest in technology back to his early twenties. Attesting that “Cameron would stalk the library at the University of Southern California, photocopying graduate student theses on esoteric filmmaking subjects like optical printing,” the young Cameron


113 Ibid.
117 Ibid., 26.
118 Mark Milian, “James Cameron Biographer Says the ‘Avatar’ Director is Half-Scientist, Half Artist”.
“essentially put himself through a graduate course in visual effects at the top film school in the country without meeting a single professor.”

Within the vfx community of feature films, in spite of a long history of employing traditional special and visual effects, Steven Spielberg has formerly been known for his disbelief of relying on digital tools, CG, and the use of mocap and 3D animation to enhance authentic storytelling.

Discussing Cameron’s Avatar and Spielberg’s use of Cameron’s technology for his then upcoming The Adventures of Tintin (Steven Spielberg, 2011) Spielberg professed, “I like to think of it as digital makeup, not augmented animation. It’s basically the actual performance of the actual actor, and what you're simply experiencing is makeup.”

Some practitioners sympathize with Spielberg’s choice of words. Having worked on all of the most CG and vfx heavy films that employ mocap mentioned in this thesis, including King Kong, Avatar, Rise of the Planet of the Apes (Twentieth Century Fox, 2011), The Hobbit: An Unexpected Journey (Peter Jackson, 2012) and currently in production of The Hobbit: The Desolation of Smaug (Peter Jackson, 2013), 3D artist Mathias Larserud explains the use of effects involving performance capture and CG characters, using the same terminology as Spielberg:

I think Gollum and Caesar [played by Andy Serkis in Rise of the Planet of the Apes, author’s note] are perfect examples of the use of motion capture. In both those cases I think the visual effects are more advanced makeup than a visual effect. They give the actor a "digital makeup" that helps them perform a role that otherwise might not have been possible to do in a believable way. Imagine someone in makeup trying to do Gollum. It would not have worked.

Media and production scholars have never questioned that filmmaking is a collective effort but the extent of how this collaboration unfolds has not been thoroughly analyzed earlier, especially in the context of digital visual effects and CG characters. Acknowledging that “the subtle movements in a performance […] are hard to get. Movements of eyes, muscles in the face and hand are something that I still think is not something that you can accurately capture. Lots of tweaking is still being made after the recording is done”

Larserud wants to make sure that the collaborative efforts of the animation team are not overlooked, while at the same time granting the essence of the performance belong to Serkis. Although some practitioners

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120 Rebecca Keegan, The Futurist: The Life and Films of James Cameron, 39.
122 Mathias Larserud, interviewed by author.
123 Ibid.
may sympathize with the ‘digital makeup’ choice of words for the sake of argument, others fear that the use of such language may be inadequate and misleading. Industry veteran, advanced technology and motion capture expert Eric Furie who currently manages digital systems and creative computing at USC’s film school, breaks down the restrictions of performance capture and implies collaborative efforts behind the creation of a complex CG character:

[T]he final product seen on the screen is not a pure acting performance in the traditional sense of the word. While actors may function as the primary author of their performance-captured characters, the process relies on contributions from animators that arguably exceed the contributions of traditional costume designers and makeup experts.

The detailed information pertaining to face movements are of particular interest in reference to such CG performances as Caesar and the other apes in *Rise of the Planet of the Apes*. Since all of the emotions that the ape Caesar had to communicate were to be read in his face – not through words – there never was a choice of using makeup. Director Rupert Wyatt explains, “[Weta Digital] are at a stage where they can create photo-realistic apes.” Interestingly, at least for non-human characters, we have now arrived at a point where digital visual effects can be far more realistic than any traditional visual effects, special effects makeup or animatronics. Evoking North’s speculative wonder, Caesar and the other apes could be seen as an example of illusory images that allows the spectator to imagine what may lay ahead in future films.

Producer Rick McCallum asserts how the natural boundaries of a live-action film shoot inhibits the director from re-shooting any sequence even after discovering certain elements in dailies that he wants to change. Especially in big scale productions where a day on set might be worth a million dollars if deemed necessary for the story, making demands of expensive reshoots the director would be fired by studio executives, or at least considered ‘completely nuts’. “But, you can have 50 or 60 people working on a complex visual effects shot that may be five or six seconds long, and a director will watch it in a room on a loop.

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125 Hugh Hart, “When Will a Motion Capture Actor Win an Oscar?”.
127 Animatronics are mechanical puppets mainly used in movies, and were developed by Disney in the early 1960s.
where it goes over and over and over.”

McCallum continues, “Well after ten or fifteen times he’s seen it, of course you’re gonna start to see the faults in it.”

Touching on crucial matters, McCallum not only begins to pinpoint the difference in how a live-action shot is judged by a director, but also the physical invisibility of visual effects workers: having never present on set, the amount of vfx artists, animators and production personnel involved in creating the effects remain “invisible” to the director. Because the director mainly communicates with the visual effects supervisor, he forgets “that there’s probably another 50 people who make exactly the same amount of money, if not more, than the people that were shooting the film, and they’ll spend five or six days instead of one day working to make these changes.”

Film producers understanding the complexities behind visual effects as intensely as McMallum may be rare, yet constantly aware of budgets and time constraints, chances are that they can be more aware than directors. McCallum explains that the director, although the creative head of production, unfortunately rarely understands the processes behind creating visual effects. This can be harmful to vfx production processes. McCallum’s example illustrate how the invisibility of the vfx workers serves as metaphor of the often invisible vfx they produce, yet notes that it is far more common that directors are physically detached from a huge part of his creative team. Unlike James Cameron, it is far more typical for a director to possess the artistry commonly associated with his or her position, as opposed to a deeper insight in the technology or processes that vfx production involve. Peter Jackson who promotes the industrious job of vfx workers through his extensive behind-the-scenes videos and bonus materials on DVDs and Blu-ray discs, Cameron has been known to certify the extension of vfx. When challenged by Keanu Reeves for presenting ‘unrealities’ in Avatar, Cameron simply replied: “I’m betting you’ve been on a couple of movie sets. When was it ever real?”

Disputing the mechanisms of on set realism, Cameron concluded, “There was kind of a wall there and nothing over there […] there was a guy on a ladder with his ass crack hanging out, there’s fake rain. Your street, night, exterior in New York was a day, interior Burbank. What was ever real?”

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129 Previsualization Society presents Post Visualization, video by Autodesk.
130 Ibid.
131 Side by Side (Company Films, 2012), interview with James Cameron.
132 Ibid.
A Departure From Genre

While “[v]isual effects can be used to create spectacle, […] more often they work in subtle, nonspectacular ways”\(^{133}\), it is the purpose of this section to survey the latter through a few selected examples. Director Christopher Nolan may have compared digital imagery to quick solutions and “bad illusions”\(^{134}\) but in *Batman Begins*, the filmmaker still employs both visible and invisible vfx – the latter arguably a departure from genre per the definition that they do *not* cater to the spectacle. The over 300 vfx shots created by Double Negative also included numerous other set extensions and enhancements of Gotham city, in addition to digital stunt double work\(^{135}\). Stephen Prince compares the integrated elements of vfx to painting, and denoting painting as “fundamental to cinema”\(^{136}\), tying back to traditional methods that used by filmmakers to create environments or enhance landscapes too difficult to photograph. Describing the matte painter’s artistry as different from the photographer’s, Prince suggests that “matte paintings illustrate the limitations of the photographic model of cinema”\(^{137}\), highlighting the possibilities of what can be transferred to the screen through vfx, and adding that “as soon as cinema was invented, it drew upon painting, and painting has remained an essential tool for images that cannot be photographed.”\(^{138}\) In *Batman Begins*, “The monastery is a 1/48 scale miniature composited into a digital landscape created using a scan of footage of a mountain and glacier location in Iceland”\(^{139}\) (Fig. 4), a process which began by extracting “the terrain from the craggy landscape”\(^{140}\), before tracking in the miniature which was shot against a green screen (Fig. 5).

The landscape was matchmoved based on the trackpoints in the plate “to generate a 3D surface mesh giving the basic topology of the mountainside”\(^{141}\), then enhanced in detail by modelers and embellished for added drama “whilst preserving continuity with the actual surrounding landscape”\(^{142}\) and beauty lit. Matte painting work integrated the real and miniature landscape, and passes of digital snow was added using “Maya dynamics, fluid
systems and custom rendering using Double Negative’s proprietary DNA particle renderer”\textsuperscript{143} to create the harsh weather conditions required for the scene. In this example, \textit{Batman Begins} demonstrates one of many invisible vfx in the movie (Fig. 6).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig6.png}
\caption{The final composite of the monastery as seen in \textit{Batman Begins}.}
\end{figure}

Having miniatures or partial sets incorporated into a composite of digital layers is a bourgeois technique used to place ‘real’ elements in virtual worlds employed by a majority of Hollywood movies today. Compositing multiple layers explained by Chung being a process in which “each layer retains its thickness and texture; a heterotopic perception thus enables us to recognize the hidden labor embedded in a composites space”\textsuperscript{144}. Thus, the present residency of an eclectic blend of CG and vfx in movies may be abundant even when it comes to invisible effects in fantasy-adventure, science fiction and super hero movies, but they are certainly not limited to these genres. In many ways vfx make the impossible possible, in the context of reflecting authentic bodies and realism.

Additionally, a short breakdown of Steven Spielberg’s \textit{War Horse} demonstrates how the gap between visible and invisible visual effects may be linked. Framestore in London provided over 200 shots for War Horse that composed all of the vfx work. “It was a mixture of work including CG horses, CG barbwire, trainer/rider removal and matte paintings”\textsuperscript{145} says CG supervisor Mike Mulholland. This type of invisible vfx work can be tedious, time-

\textsuperscript{143} Mike Seymour, “Double Negative Breaks Down Batman Begins”.
\textsuperscript{144} Hye Jean Chung, “Media Heterotopia and Transnational Filmmaking: Mapping Real and Virtual Worlds”, 91.
consuming and tricky to do “since removing a rider involves putting in parts of a running horse that were hidden from view”\textsuperscript{146}, Mulholland explains. To achieve this, CG parts of the horse had to be created and then patched over the rider. “This sometimes included simulated reins, stirrups, bridle and saddle that needed to match the ones that were in the plate. The rest was again a matter of frame by frame paintwork.”\textsuperscript{147}

The most challenging vfx and animation work that the team created amongst the CG horses was undoubtedly that of the protagonist horse, Joey. Spielberg had been opposed the use of digital horses, but when the shoot arrived at the point of Joey jumping over a tank what the filmmaker “captured in camera simply wasn’t working, a fact remarked on a couple of times by Spielberg during reviews.”\textsuperscript{148} Vfx supervisor Ben Morris made the decision to try and resolve the situation. When presented with the new horse, Spielberg was impressed and asked Morris “where the footage had come from”\textsuperscript{149} whereupon Morris could finally reveal that the shot was in fact completely digital\textsuperscript{150}. As a result, the digital horse was also used for the sequence in which Joey is running alongside trenches, a shot which starts with a real horse transitioning to the CG horse, then leaping over trenches twice before making a bad fall, and getting up (whereupon the shot transitions back to the real horse) to gallop on\textsuperscript{151}. Lead animator Laurent Benhamo said that due to “the necessity of absolute reality […] nostril flare, vein pulse, skin slide – it all had to be spot on.”\textsuperscript{152} Through this achievement, not only did Joey the CG horse bridge the gap of the trenches, but the vfx and animation teams at Framestore managed to bridge a rift between digital effect fakery and authenticity.

In doing so, this example of invisible vfx is indexical not only to the diegetic aspect of visual effects but also to the speculative aspect, suggesting that the future may only further blur the lines between what is ‘real’, and the illusion of vfx in Hollywood movies (Fig. 7, Fig. 8).

\textsuperscript{146}Michael Philips, “Steven Spielberg and ‘War Horse’: Kindred Spirits”.
\textsuperscript{147}Ibid.
\textsuperscript{149}Ibid.
\textsuperscript{150}In addition to the story as told in Computer Graphics World, I had previously heard it told from an animator at Framestore who worked on the show and his version attests that not only did Spielberg believe he was looking at a real live horse when presented with the digital horse, but the director’s adamant attitude against the use of vfx was fundamentally compromised due to Joey the CG horse.
\textsuperscript{151}See the Making a War Horse Shot video breakdown, showing the original plate without the horse and the step-by-step transition between the real horse and creation of the CG horse, with added vfx at the It’s Art Mag website, presented by lead animator Laurent Benhamo who animated the sequence: http://www.itsartmag.com/features/making-of-a-war-horse-vfx-shot/#.UWU5n6vjZ-N.
\textsuperscript{152}“War Horse” in Computer Graphics World.
In *Skyfall*, Javier Bardem’s villain’s lair at the deserted island Hashima\(^{153}\) (Fig. 9) is an authentic location in Japan, but 2D supervisor John Galloway at Double Negative accounts for the wide shot of the island that he compositied that “the whole image is fake and has been blended together to look like it was photographed as part of the scene.”\(^{154}\) Galloway elaborates in explaining that “the image is a blend of photography for the skies, CGI for the buildings, island and helicopters, matte painting for small details and live action elements for movement, such as smoke and water splashes”\(^{155}\), thus transforming the environment at hand to be worthy of the villain’s lair through digitally compositing layers consisting of 2D and 3D elements, making the scene look as if the location was entirely authentic (Fig. 10, Fig. 11).

Another example in the movie where vfx is reasonably invisible and provides opportunity not possible without them, is the scene with the scorpion that sits on Bond’s hand as he attempts to down a shot of liquor. Providing around a total of 100 vfx shots\(^{156}\), the most notable invisible vfx by the fittingly named boutique vfx company Nvizible in London, is shown in the bar scene. Nvizible “provided a small pyramidal tracking marker made of wire and colored modeling clay” for Craig to balance on his hand, and “then tracked the object, animated a small [CG] scorpion based on the movement of Craig’s hand, and rendered the creature to emulate the arthropod’s pale translucency”\(^{157}\) (Fig. 12, Fig. 13).

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\(^{154}\) John Galloway, email to author, May 9, 2013.

\(^{155}\) John Galloway, email to author, May 9, 2013.


CG supervisor Martin Chamney comments that the scorpion was not based on a scan of a real scorpion integrated into the digital composite, but created completely as a CG model and rigged before it was animated using photos of a Blonde Desert Hairy scorpion as reference.\(^{158}\)

The risks involved in shooting with a real scorpion on set would not have allowed such a scene, as would such believable results not have been possible in the earlier days of vfx. Lastly, a perhaps even more invisible example of vfx are imbedded in *Black Swan*. Darren Aronofsky’s ballet psychodrama seamlessly integrates vfx beyond the many hallucinogenic animations and surreal accounts in the film, such as the swan wing-replacement of Natalie Portman’s arms. One example shows the necessary removal of crew (Fig. 14, Fig. 15) and another example demonstrates the subtle manipulation of the floor over which Nina dances (Fig. 16). Bearing in mind that this subchapter far from accommodates a comprehensive representation of diegetic and invisible digital effects\(^{159}\), the selection of invisible vfx do survey pivotal principles. In creating partial environments through 2D and 3D elements through set extensions and matte paintings, manipulating surfaces and original plates to meet necessary and aesthetic needs, and via the annexed samples of real life animals through CG, vfx in these films “harmonise the organic and the synthetic.”\(^{160}\)

The following subchapter concludes the actual geographical dissertation in the context of highlighting and discussing the current state of the vfx film industry and its practitioners.

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\(^{160}\) Dan North, *Performing Illusions*, 129.
The Niche of VFX: Green Screams, and Blue-Collars

“The culture of the business is: I’ll work 24 hours a day, you don’t have to pay me because, “damn, I’m working on Star Wars!””

-Scott Ross, co-founder of Digital Domain

As this text has denoted in its previous chapters, the collective aspects of creating visual effects are innate in the practitioners working within the vfx industry. Whether vfx artists and production workers are active in New Zealand or London, they function inside a mutual dependency on each other through the temporal processes that daily production routines require vfx practitioners to adhere to on a daily basis. Vfx workers are yet to be represented by a union and remain the only group of film workers to date not protected by any guild or labor’s trade union. Although recent events have initiated efforts to create change, the lack of a guild or union is a big part of why the vfx industry and its workers is in such a dire position. In an open letter to the film industry, VES Executive Director Eric Roth writes, “"[t]he amazing irony is that while 47 of the top 50 films of all time are visual effects-driven and billions of dollars of profits are generated yearly, the actual people who create the work are becoming an endangered species in California."” Noted as CG by the media, the tiger and the ocean in Life of Pi are indexical of real life elements and arguably invisible effects that are essential to the film. The ocean (Fig 17) is on screen continuously in more than 3/5th of the film and in regarding “the ocean as a character” the vfx teams developed water simulations impossible to detect as digital creations in order to match the authentic movement of water. The tiger Richard Parker (Fig. 18) was not the only animal completely modeled in CG (only one animal – a hyena, which was used in about seven shots – was on set) but due

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to the nature of a real life tiger and simply not wanting “our actor to get eaten”\textsuperscript{167}, as vfx supervisor Bill Westenhofer told The New York Times, it simply would not have been possible for Ang Lee to make a movie that features a tiger without vfx. Alas, in the aftermath of \textit{Life of Pi} winning a Bafta for Best Visual Effects and Oscars for Best Cinematography and Best Visual Effects the 85\textsuperscript{th} Academy Awards ceremony shortly after the vfx company, Rhythm & Hues had filed for Chapter 11 on February 2011 – the company being one of the original ‘big 8’ visual effects facilities that also included ILM, Weta Digital, Sony Pictures ImageWorks, Digital Domain, MPC, Double Negative and Framestore\textsuperscript{168} – an internet storm of blog entries, letters and articles devoted to the vfx industry’s plight flooded the Internet, newspapers and magazines. Correspondingly, Pixomondo, a German vfx company making its mark by boasting offices around the globe and providing 24-hour services of vfx for film, television and commercials, closed down its facilities in London, Detroit and Shanghai\textsuperscript{169} this year, in spite of winning the Best Visual Effects Academy Award for \textit{Hugo}. After wrapping work on \textit{Oblivion} (Universal Pictures, 2013), founder and CEO Thilo Kuther stated that Pixomondo will be “focusing on design and conceptual work”\textsuperscript{170}. On April 26, it was announced on the company’s official Facebook page that the Berlin office would be closed by May 1\textsuperscript{171}, leaving a Toronto, Beijing, two California offices, and four German offices operational – making Pixomondo an example of an Oscar-winning vfx facility having to make significant cutbacks, possibly even having to withdraw from feature film.

The state of the vfx industry is not limited to economical burdens, as mentioned earlier, it also has struggled with getting recognition for CG performances. Some members of the vfx community had in part already begun to oscillate following Andy Serkis’ ecumenical and effacing claims of performance, offering commonsensical responses – some very


personal, like one animator’s open letter to Serkis, suggesting that “for a guy who has positioned himself to be the spokesperson for performance capture”\textsuperscript{172}, Serkis does not “\textit{quite} understand what goes into the entire process”\textsuperscript{173}. The seemingly reflexive blow from the mocap actor was rebutted by a legion of animators online, and vfx practitioners, tired of working inhumane hours without getting paid over-time began to rally. Ex-ILM, vfx supervisor Scott Squires affirms that “people working on visual effects typically will start with a 50 or 60-hour week, and that can go up to 90 or 120”\textsuperscript{174}, adding that “[e]very project is custom-done by hand. We use the computers, but artists have to look at those computers and make adjustments. It's not like we press a button and 500 shots magically get done. Every year we're asked to do more complex effects, and a greater number of them.”\textsuperscript{175} Squires was one of the key individuals to draw attention to the emergency of the state of the vfx industry, uniting over 400 vfx workers in Los Angeles to show solidarity (Fig. 19), outside of the Academy Awards, demanding “a piece of the Pi”\textsuperscript{176}. Knowing Life of Pi would win the Oscar for Cinematography and Visual Effects, Squires thought it was a perfect moment for the vfx community to stand up and express what is ‘wrong’ with the film industry\textsuperscript{177}.

Although Squires efforts for the Academy Awards protest were local rallying US workers, the situation with vfx practitioners doing unpaid overtime and then being forced to move and live lives as migrators because companies cannot keep workers on staff or even go bankrupt, is a global issue. Noting the state of the industry as having reached “a fever pitch”\textsuperscript{178}, vfx practitioners and supporters of the community worldwide began to protest on Twitter and


\textsuperscript{173} Tim Borrelli, “An open letter to Andy Serkis”.


\textsuperscript{175} Ibid.


change their Facebook profile pictures to blank, “green rectangles, representing the green-screen technique used in video production and post-production to remove the background and replace it with visual effects.” Some keep seeing the film studios executives as the ‘enemy’. Others are imploring for the subsidies war to end.

Nevertheless, there are practitioners active in the grassroots movement that turn the pointing finger toward themselves and question what is inherently wrong within the vfx industry and how it has dealt with studios in the past, possibly challenging bounds of self-industrial theorizing in the process. “I think the visual effects community has been remarkably apathetic for the past decade,” says Peter Oberdorfer, a former vfx artist180, and Scott Ross who has been trying to get VFX houses to come together and unite for a long time, states that the only solution for vfx facilities is to change the business model181. A joint podcast featuring both Squires and Ross asked ‘whose fault’ it is that the community has ended up in this situation, both proclaiming that they are the ones who “agreed to a fixed fee, we’re the ones when the studio says ’jump’ we say ’how high?’, when the director says ‘ah I think I’d like it a little orange’ we say ‘ok let’s do it’: we’re the problem.”182 Lacking unions, the tradition of vfx companies under-bidding each other during formative years will only continue a downward spiral of less humane work conditions for vfx practitioners, and due to the innate solidarity of workers – simply grateful of being part of a creative team on Star Wars and not individually responsible for how the industry promotes itself – the change would arguably happen most beneficially through an international collaborative effort between vfx companies.

In present-day vfx production, as discussed in the Production Processes subchapter, there are feasibly as many vfx production pipelines183 as there are vfx companies, or even shows; and, increasing complexities in temporalities continue to complicate how work and labor should be structured. Chung aptly describes these convoluted processes stating:

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180 Emily Rome, “What’s Going On with the Troubled VFX Industry?”.  

182 Fxguide: fxpodcast #245: VFX Roundtable with Scott Squires, Scott Ross, David Rand.  
[S]ynchronization among the various departments, which are often located in geographically diverse facilities, is a major challenge on multiple levels: temporal synchronization (or time-zone management), software synchronization, and synchronization of language, including the lexicon of visual effect technologies.\textsuperscript{184}

Thus, the helicoid of multi-national communes that make up a vfx team in London, Wellington, Stockholm, San Francisco, Vancouver, Copenhagen or Singapore could be described as an essential sub community of the ‘media heterotopias’ that Chung describes, interpreting digital “compositing as metaphor and methodology”\textsuperscript{185}. In line with North’s speculative level of wonder, what has been seen so far is an indication of the virtual and actual worlds that visual effects embody, and with them the pipelines, teams and production processes will continue to grow and expand the presence of visual effects in Hollywood diaspora. Ultimately, what the vfx community will do to survive its current turmoil is indicated through the actions of the grassroots movement, the collaboration between VES and vfx practitioners and possible inceptions of a union.

4. Conclusion

One of the recurring explanations from trade workers within the vfx industry to why they have been misunderstood and missed out on any respect from the larger film industry, looking beyond subsidies, unpaid over-time, and pointing fingers at studio executives – is what essentially makes vfx a substantial contribution to Hollywood films today. Trust, is described as the most essential part of the intercommunication between vfx houses and the film director. Animation supervisor Steve Aplin, summarizes the benefits of working with a director like Andrew Stanton:

A director who understands vfx/animation is more likely to step back and let us do our job with minimal interference (in this case anyway). Andrew would work out the rough blocking with us till he felt all the story points were being hit, then leave us to finish it up. Few directors feel confident enough with the process to let that happen.\textsuperscript{186}

\textsuperscript{185} Hye Jean Chung, “Media Heterotopia and Transnational Filmmaking: Mapping Real and Virtual Worlds”, 91.
\textsuperscript{186} Steve Aplin, email to author, April 25, 2013.
Inasmuch as several practitioners have discussed the complexities of processes at work within film culture itself throughout this essay, some production scholars such as Chung recognizes that language and communication are determining for the successful collaboration between departments. Regarding vfx as the tool by which the film industry is capable of building ‘impossible’ characters and worlds on the big screen, and making projects not previously possible, this essay has discussed a selection of vfx-heavy movies, illustrating that a fantasy creature such Gollum as can be as realistic and convincing as an in all likelihood authentic tiger or a galloping war horse, that are in fact the result of the complete fakery and illusion of high-end vfx.

**Summary of Methodology & Aims**

Competent and gifted artists working on- and off-screen have populated the upper-class neighborhoods of the movie industry since the dawn of cinema. This essay has not contested that they deserve their praise; rather has it been the avenue of this research to address the conundrum that arises when the complexities of motion capture, 3D animation and vfx, that in part are examined in this thesis, have become such intricate and involved aspects of the narrative that they are difficult to tell apart from live-action footage. Exercising this research with the methodological tools of the scholar-practitioner, I have shown that traditional problems with access to the subjects that scholars study may be bridged not only by previous scholar-practitioners that inject themselves as entry-level assistants in the film industry, but that additional and alternate routes of access can be achieved by those who have walked in the practitioner’s shoes prior to embarking on research within the world of academe. During the congregation of information for this essay, I have consulted an international scope of vfx companies, practitioners and films, all the while considering temporal aspects of production within the vfx film industry, and how they function from a global perspective in relation to Hollywood diaspora.

**Discussion of Results**

A vfx production process is a living entity. In spite of production team’s diligent struggle to tame the beast of unpredictability for long enough periods to clear a milestone deadline, it remains constantly wavering to the needs of the production and the creative decisions or changes that the film director makes. A production process expands, retracts, goes off on a
tangent in search of better, faster, smarter and more creative ways to solve problems; it reconvenes with the main pipe, takes one step forward, then two steps back, sometimes arduous due to its very nature. The art/science proficiency embodied by vfx artists to a lower or higher extent (ultimately embodied by James Cameron and, arguably, by the diegetic and convincing speculative realism of Peter Jackson’s virtual worlds) is often forgotten through reflexive self-theorizing of actors and studios who offer reductive and proprietary solutions; shunned by unintentional and effacing directors and often mislabeled by journalists and scholars, the vfx community still struggles with recognition for their labor. In terms of terminology (sometimes a case of semantics, and other times misconstrued depending on the context it is being used), Dan North has since his 2008 publication Performing Illusions reported that although he has employed the term ‘special effects’ when discussing visual effects, the main reason for doing so is that he “wanted to refer not to particular processes but to a general ‘theme’ or concept of illusionism in cinema, regardless of how it is achieved” – adding that he has nevertheless in subsequent work, “distinguished between the two words.”

Furthermore, this research has suggested that part of the problem lies in the redundancy of spotlighting computer technology; while character animators too go through a certain process of interpreting a character, similar to that of an actor, in order to translate emotions to motions on screen, I view the acting-credit conundrum as not so much of a conundrum than a misconception. Vfx supervisor Joe Letteri illustrated the responsiveness needed in the process of reimagining the CG character of Caesar based on Serkis’ mocap performance: “What we try to do is use what we see on every frame to interpret the underlying emotion, and then make that emotion come through the new character, so it’s a very sort of subjective process in a way that sits on top of the technology.” Letteri remarking on the CG character as a “new” character implies an even deeper connection with the temporalities of production processes and practitioners than the content of this thesis has attempted to investigate. Stephen Prince rightly identifies “[s]cholarly and popular discussion of performance in cinema [limited] to the contribution of a human actor […] and performance traditions that extend away from live acting to animation are often regarded suspiciously.”

Again, purely animated characters, humanoid or animalistic, are generally considered as

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187 Dan North, email to author, April 25, 2013.
188 Ibid.
expressive and emotionally engaging as live performances can be, so it appears to be in the specific context of the collaborative and complex *amalgam* of the CG character as depicted within live action contexts (as discussed in this thesis), that misconceptions and misunderstandings occur.

Granting special recognition to the level of integration of invisible vfx into Hollywood films, the denotation of invisibility in this essay remains symbolical of vfx crews and practitioners as part of Hollywood filmmaking. Acknowledging varying degrees of “quality and substance of particular uses”\(^{191}\) of visual effects, the rapid growth-spurt of digital effects in movies during the past decade has rendered spectators, journalists and many scholars aware of vfx but still not fully inducted in the temporalities of production processes. In agreement with Hye Jean Chung’s belief that the issue of invisibility of materiality through visual effects holds political meaning, I see future developments in socio-political discussions concerning vfx as determining for the vfx film industry due the “diverse forms of labor and the uneven distribution of ownership claims over the finished product”\(^{192}\) recorded in this study.

As previous media and production scholarship has largely been focused on the television industry, and the political economy that has “traditionally dominated intellectual considerations of the media industries”\(^{193}\) in the geographical location of Hollywood, this research has purposefully disregarded further discourses on vfx in television because of vastly varying temporalities of production – and due to the gap that exists in previous production studies, focused on the international film industry at large, beyond actual Hollywood and in virtual geographies of the vfx niche. Discovering high-end visual effects as innately diegetic and intellectually stimulating with the ability to entail intertextual and comparative properties, as North suggests, this research has looked at statistics of world wide box offices and a selection of visual effects in films; and, it was consulted industry and practitioner sources that show how vfx in films are not only key to storytelling, but that many of these highly profitable movies would not have been made without high-end vfx. I proposed throughout this essay, along the lines of David Hesmondalgh, that media entities can and should be theorized as “cultural industries”\(^{194}\) – while extending this notion to argue that the vfx industry today in particular, as shown through its Hollywood diaspora, embodies the most

\(^{191}\) Dan North, *Performing Illusions*, 181.
[multi]cultural and diverse industry and that it has a direct and visibly consequential influence on the narrative of major Hollywood movies.

Considering the “conjunction between art and science, as these domains collaborate in the design and use of technologies that make possible the creation of a new class of images”\(^\text{195}\) this essay has ultimately advocated a halt to the “scholarly and popular discussion of performance in cinema”\(^\text{196}\) that limits contribution to the actor alone. Looking beyond the technology, the artistic sensibilities that character animators and vfx artists employ and contribute with to the CG character are crucial parts of the diegetic process, and indicative of the science/art persona. Conflicting powers within the Hollywood film industry are clearly expressed through its practitioners and vfx practitioners are not exempt from internal dispute, but it is the sense of community that the international vfx industry struggles to maintain that suggest a closer and less cynical reading of subcultural departments at work. Advocating a deeper interpretation of visual effects in movies and the vfx community as a film industry subculture, this thesis has anchored the premise of a global vfx presence, delineated in physical and invented worlds.


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Video Games

*Skyrim* (Bethesda Softworks, 2011)

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