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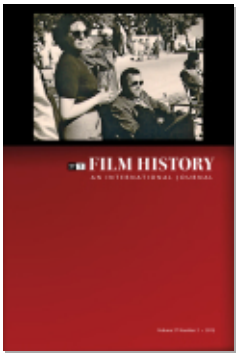

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Julie Turnock

How is it that when watching films like the recent *Star Trek* (2009) or *X-Men Origins: Wolverine* (2009), we can generally state with confidence that the effects were good, or not? A common notion of realism in special effects involves an appeal to the sense that "it just looks right". But this notion has been surprisingly unexamined. Is realism to be understood as perceptual realism, an aesthetic that replicates what the eye sees "in real life?" How do recent special effects-driven films, such as *Star Trek*, the *Transformers* films (2007, 2009, 2011), or the *Iron Man* films (2008, 2010) suggest realism, and how does this concept of realism extend to non-fantasy based films such as *Munich* (2005) or *Zodiac* (2007)?

On closer examination, it is clear that in contemporary special effects, digital imaging does not simply try to imitate a common sense notion of perceptual realism, but instead, replicates an accepted aesthetic *photo*realistically: rather than modeling its look on the "real" or phenomenal world, special effects' digital techniques imitate the look of photography.[1] More specifically, contemporary effects aesthetics allude to a specific time period – the look of certain aspects of 1970s cinematography. Through constant repetition, we have been conditioned to accept this specific historical aesthetic as perceptually real. In order to generate this sense of photorealism (an aesthetic that imitates the perceptual cues of photography), and despite their many misleading statements to the contrary, effects designers of recent blockbuster films do *not* typically try to emulate the marks of digital capture, nor do they design effects simply to replicate the aesthetic of "photography" in a general sense. Rather, in contemporary digital effects, filmmakers hearken back to an earlier era more closely associated with the integrity of the photographic image: to the 1970s, and specifically to 1970s materialist docurealism of the sort associated with Hal Ashby, Terrence Malick, and Monte Hellman. This style was developed at the time to accentuate – not hide – the process of filming, and included such techniques as lens flares, handheld cameras and rack focus, among others.[2] This essay will explore the reasons for the expansion of 1970s special effects production and the development of this aesthetic, especially at the effects company Industrial Light and Magic (ILM), and why it continues to live on long past the cinematographic style's historical heyday. Finally, it will show that ILM veritably invented our contemporary notion of photorealism, not only in special effects, but in the cinema and moving image capture realms more broadly. This argument has important consequences for how we judge the rhetorical truth value

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of what is presented to us, and accept it as visually realistic.

To begin with, any study of realism in the cinema and its relation to digital technology must move beyond issues of the digital and the index, and the simple assertion that the "digital isn't indexical" or that "photography is indexical". Tom Gunning and others have convincingly argued that there is always an aesthetic distance between "the world" and the fixed image that results on light sensitive surfaces, whether the apparatus that fixes the image is collodion wet plate, dry plate or a computer chip.[3] Andrew Johnston and others have very usefully described the various hardware and software platforms and systems that, as a medium, set the aesthetic parameters for digitally generated images and digital capture.[4] It should be clear by now that the concept of the index has never been the most helpful term when conceiving how an aesthetic of realism (in any of its iterations) is executed or received, however André Bazin, Christian Metz, or Siegfried Kracauer are interpreted.[5] This is especially true when one brings special effects into the conversation, in that special effects, along with animation, must always be dismissed or made exceptional before continuing with any argument about cinematic realism based on the ontological nature of the photographic image. Clearly, special effects and animation represent major exceptions to the ontological-realist argument.[6] Special effects have always easily exploited cinema's ability to massage a reality effect through blatantly artificial means (sometimes embarrassingly so), such as the use of mattes, miniatures, traveling mattes, rotoscoping and various other kinds of composites.[7] Furthermore, given the preponderance of visual effects and animation in so much recent cinematic production, any theory of cinematic realism that excludes computer generated images (CGI) cannot productively illuminate the cinema's relationship to the illusion of reality.

Furthermore, this essay will not make a biological/cognitive case to parse what the eye "actually" sees or how.[8] That is well beyond the scope of this argument. Instead, I am concerned with describing the historically contingent, technologically inflected building blocks of the dominant aesthetic of contemporary photorealism. Understanding how special effects technicians design and build their reality effects, and providing a rhetorical analysis of how they justify their choices and what kind of models they look to, can help reveal the often obscured aesthetic layers of which the cinema's illusion of reality is comprised. Moreover, we can see how these layers can be built from scratch (and have been, well before digital imaging), often requiring little or no traditional live action photography. The famous opening "fly over" sequence of the first *Star Wars* film (1977) provides a well-known example.

Indeed, in terms of contemporary digital production, we can first begin to approach these questions with a look back to the 1970s.[9] The success of such 1970s special effects-driven films as *Star Wars* and *Close Encounters of the Third Kind* (1977) initiated widespread changes in American filmmaking with consequences that still reverberate though today's digital blockbusters.[10] The original *Star Wars* trilogy, *Close Encounters*, *Raiders of the Lost Ark* (1981), and a few other films of the era are often casually said to comply with, or "hold up" against contemporary standards of cinematic realism – unlike such other films as *Logan's Run* (1976), *Dune* (1984) or *Clash of the Titans* (1981), which are generally judged not to.[11] What this seemingly subjective judgment suggests is not that those films are in fact especially realistic, or that they represent a progressive "step forward" for special effects realism, as is usually assumed. Rather, it indicates the extent to which the special effects aesthetics developed for the *Star Wars* franchise in the 1970s to match the films' live action cinematography continues to dominate the aesthetics of 2000s digital production.

In other words, these films from George Lucas's effects wing Industrial Light and Magic still hold up to contemporary standards because they *set* the standards in the 1970s, and continue to do so today. Drawing on statements from cinematographers and special effects artists, my own research has chronicled how ILM developed its powerful style of photorealism over the course of the last three decades.[12] In large part due to the economic success of its product combined with shrewd business practices, ILM has been in a position to promote its own in-house style as the most powerful and influential in the special effects business (although ILM has always stayed current with changing cinematographic trends by mixing the 1970s approach with other styles). Scrutinizing ILM becomes especially important when we consider that special effects filmmaking has formed the basis for the most lucrative Hollywood filmmaking since the late 1970s, and comprises more and more of most films' total shots (compare *Star Wars*' 365 effects shots to *Avatar's*

2500 effects shots in 2009).[13] ILM has been the primary effects house behind most of the films we consider central to any study of blockbuster filmmaking for the last several decades, including the *Raiders* franchise and all the films by Steven Spielberg since 1981 – except for his 2011 releases *The Adventures of Tintin*, where computer animation was done at Peter Jackson's Weta Digital, and *War Horse* – *Terminator 2: Judgment Day* (1991), and more recently the *Star Wars* prequels, the *Iron Man* films, the *Transformers* films, many of the environments of *Avatar*, and numerous others, both spectacular and more mundane.[14] With these influential examples in mind, ILM's approach becomes all the more important to analyze.

What may be surprising, however, is that ILM, as the most dominant special effects producer for the last three decades, has not just set the agenda for how *special effects* should look in movies through its industrial and economic power but, as digital technology pervades all aspects of cinematic production, dominates the aesthetic of photorealism in the cinema and moving image capture more broadly. In other words, a great deal of cinematography has come to look like special effects cinematography, which maintains close aesthetic links to the 1970s.[15] Even digital capture, which would seem to encourage an alternative, has "improved" in the 2000s to look and act more like its photochemical precedent.[16]

Recent theorists of digital and computer generated imaging, such as David Rodowick and Stephen Prince, have explored the ways digital technology attempts to reconstruct what they call the effect of "perceptual realism" with digital tools to design visibly plausible worlds.[17] Perceptual realism, however, is a realism that is based on what the eye sees "in real life". Cinematographic realism, on the other hand, is a photographic realism: it is based on what the camera sees, not on what the eye sees and implies the impossible attainment of an "ultimate" realism. Cinematic realism is not a matter of perceptual realism but of photorealism. 1970s cinematic photorealism, for example, attempts to replicate a style of cinematography that suggests a sense of the camera spontaneously capturing immediate events. Since it relies upon the human eye for its controlling structuring aesthetic, perceptual realism is a wholly inaccurate characterization of the aesthetic strategies involved in cinematic representation.

Rather, photorealism better describes the characteristics of the aesthetics of visual effects because it is a *historically contingent* and changeable style, whether in the 1970s or otherwise and not dependent on a transhistorical biological eye.[18] The commonly held special effects industrial formula for photorealism seems obvious: If *x* existed in our world (an alien spacecraft, a Gollum, a fairy-tale castle) and were photographed, how would it look, and how would it move? Common sense suggests that special effects objects should look the way they do when our eyes behold things in the real world. The most important component of that formula is "*if it were photographed*". As has been recognized since at least the 1920s and theories of *photogénie*, ordinary objects undergo an aesthetic transformation when they are placed on a set in front of a camera lens, professionally lit, recorded on film or a hard drive, developed or processed, copied onto a release print, and finally projected at our local theater. Notions of photorealism change and shift historically as new and different image capture (analog or digital) techniques and technologies become standardized or expected in filmmaking practice. Therefore, if we imagine, say, a glass of juice in *All That Heaven Allows* (1955) or *Nashville* (1975) or *Miami Vice* (2006), it will have a different aesthetic look in 1955 than in 1975 or 2006.

Confusion between photorealism and perceptual realism is not surprising, since in technical, popular and academic discourse, photorealism is nearly always conflated with an unexamined notion of "it looks right to my eye". For example, Harrison Ellenshaw, matte painter on *The Empire Strikes Back* (1980), typifies the attitude in 1979:

> All that matters is if the audience will believe it on the screen. The fact is that people who know nothing about how these things are done can still tell us whether the effect is good or bad … . We say, "What do they know?" But they *know*. They've used their eyes all their lives and they know when something doesn't look exactly right.[19]

Ellenshaw repeats the common sense notion that the audience believes an effect in the movie looks real because "they've been using their eyes all their lives", rather than adding what would be the proper qualifier, "in the movies". And like most effects artists, he rarely acknowledges the historically situated aesthetic point of view that informs his sense of photorealism.

Fig. 1. In J.J. Abrams's *Star Trek* (2009), lens flare pervades the mise-en-scène.

Digital special effects practitioner rhetoric is just as misleading, in which building CGI artifacts almost always emphasizes scientistic approaches that attempt to use computer algorithms to replicate a notion of physical or biological description, such as the weight of the body in space, the blood beneath the skin, or a gleam in the eye.[20] What effects artists often leave unsaid is that the gleam in the eye they are replicating is one meant to match the cinematography – such as the eye light – and therefore the highly artificial lighting configuration the object is being placed into.

In order to achieve their desired look, 1970s ILM special effects leaders such as Dennis Muren and Richard Edlund believed that their techniques had to conform to contemporary standards of live-action cinematography.[21] This style, based on a specific kind of "New Hollywood" 1970s cinematography, did not necessarily attempt to look more *real* (to the naked eye), but rather, to look more *filmed*.[22] And this approach was to a degree pioneered or popularized by the filmmakers most associated with 1970s blockbusters, such as Francis Ford Coppola, George Lucas, and Steven Spielberg. See, for example, Coppola's *The Rain People* (1969), Lucas's *American Graffiti* (1973), and Spielberg's *Sugarland Express* (1974). Taking cues from *cinéma verité* and low-budget, independent location shooting, a primary goal of New Hollywood 1970s cinematography was to renounce studio-bound slick professionalism and instead call attention to the fact that what was in front of the camera was being filmed. This approach had the paradoxical effect of feeling artless and spontaneous (and therefore comparatively naturalistic) while at the same time reminding the viewer of the camera operator behind the lens.

A prominent mark of this approach is the use of lens flare, an effect that appears when extremely direct or excessive light causes internal reflections and scattering on the surface of the lens, appearing in the image as a spreading or flickering (often multicolored and circular) light pattern. In studio lighting conventions of the classical era, lens flares were generally prohibited. They were initially popularized as a live-action cinematographic technique in the 1960s and 1970s as part of a documentary materialist aesthetic, developed most notably by cinematographers such as Laszlo Kovacs, Vilmos Zsigmond, and Nestor Almendros, and featured prominently in such influential films as *Easy Rider* (Dennis Hopper, 1969), *Cockfighter* (Monte Hellman, 1974) and *Shampoo* (Hal Ashby, 1975). More accurately for feature fiction filmmaking, this style might be called poetic docurealism, an approach that thumbed its nose at sleek and polished studio lighting configurations, stable camera mounts and set-bound artificiality, using the aesthetic effect of light artifacts (materializing and even concretizing the light) in lens flares for various expressive purposes.

Whatever aesthetic uses lens flares served in the 1970s, they have now evolved into a stylistic cue *associated* with or prompting a sense of immediate docurealism, and in fact have become the go-to additive element to the mise-en-scène in contemporary special effects, to cue a photorealistic aesthetic. We can see this most prominently and flamboyantly in *Star Trek* and *Super 8* (2011). A lens flare cannot

Figs. 2 and 3. Terrence Malick's famous "golden hour" lighting in *Badlands* (1973) is echoed in the muted color palette of George Lucas's *Star Wars* (1977).

be considered a feature of "perceptual realism" since, generally speaking, one needs a camera lens to "see" a lens flare. Therefore, the CGI addition of lens flares is a chief indication that digital designers of photorealistic special effects are more often than not referencing the *cinematography* of earlier films, not, as is often assumed, the perceiver's actual visual experience of the world.

Beyond reproducing cinematographic lighting effects, special effects artists also often evoke photorealism by recourse to 1970s hand held and Steadicam shots. As the addition of lens flares suggests, a great deal of stylization is required for effects objects to read as "realistic". Since at least the introduction of computer assisted special effects in the 1970s, mainly in motion control technologies, special effects practitioners at ILM and elsewhere have long recognized that no computational algorithm alone generates a photorealistic special effect or CGI artifact, since that almost always results in their being received as "too perfect" and therefore "wrong to the eye".[23] Effects artist technicians may start with something based in computation or science, but then this is nearly always tweaked, stylized or transformed in an attempt to suggest how it would look as *photographed*. And an emphasis on an image's photographic aesthetic is not a mark of the optical/digital divide, since the practice at ILM long pre-dates the 1990s.

A famous optical illustration is, for example, an effects sequence from *The Empire Strikes Back* in which Luke Skywalker rides a Tauntaun in the snow. In this sequence, the effects team reconceives a traditional miniature stop motion sequence that treats it as a faux-helicopter shot. In what traditionally would have been shot straight on and horizontally (like a diorama come to life), the motion control camera rig adds irregular motion on the "z-axis", or diagonally across the x-y axis into the horizon. ILM artists enhanced this energetic effect by adding a camera wobble into the mechanized motion control program path that swoops down from an "aerial" shot to the stop motion figures, making the shot look as if captured by a hand held camera from an unstabilized helicopter, like a shot from *Apocalypse Now* (1979). This sequence meets the ILM goal of generating a special effects shot with all the qualities of a live-action shot: in this case, a subjective camera shot with excitement and immediacy suggesting, "you are there on the Ice planet Hoth".[24] This approach is still operational in films like the *Transformers* franchise. In the first film of the series, for example, the battle sequences in downtown Los Angeles are shot as if from the shoulder of a combat camera operator, spontaneously on the fly. (To emphasize this point, try imagining the unstabilized whip-pan shots as if the giant robots had not yet been composited in.) We can see this aesthetic as well in the faux long take shots in ILM's effects work on *Terminator Salvation* (2009) and also in the helicopter and banshee flying shots on *Avatar*.

Photorealistic lens flares and virtual hand held cameras are prominent marks of our acceptance of an often blatant stylization as "properly" photoreal. To be more specific, the special effects aesthetic that ILM developed for the original *Star Wars* trilogy includes the roughened look of surfaces, hard directional sunlight, a muted color palette, and hand held cameras, now associated with 1970s cinematographers. Comparing shots from, say, *Badlands* (1974) to Luke Skywalker gazing at the double suns on his home planet of Tatooine, or shots from *Easy Rider* to Luke, Obi-Wan, and C3P0 on their landspeeders, provides substance to this claim. Furthermore, ILM

has been aggressive in developing and promoting their own in-house version of photorealism, which began as a way to blend their effects in with 1970s live-action cinematography, then solidified as house style in the 1980s and finally, as a citational style in the digital 1990s and beyond, smoothly bridging photochemical and digital practices.

Again, although conceived for a particular set of projects, eventually these aesthetic elements were exaggerated and codified into a style of photorealism that had its origins in live action cinematography and, in the realm of digital effects, became a reference style for providing an "authentic" photographic look to artificially generated material. Through the 1980s and 1990s, as movie goers' eyes adjusted to the popular films for which ILM produced more and more elaborate effects sequences, and as other effects companies were forced to copy ILM to keep up, ILM's aesthetic emerged as an industry standard. Therefore, rather than becoming "more realistic", as is often popularly claimed, special effects production across the board started to look more like industry dominant ILMs, and therefore more and more *photorealistic*.

Over time, ILM's team has combined its in-house style with other styles in order to stay current and up-to-date with changing cinematographic trends. The ILM system has always been flexible enough to absorb alternative approaches. For example, on the original *Star Wars* films, the ILM team designed elements of the effects to match the trendy so-called "candy apple neon" look appropriate to the futuristic science fiction setting. *Empire* effects supervisor Richard Edlund characterized this style as a principal photography enhanced with highly reflective surfaces, a busy and buzzing mise-en-scène, and neon light traced accents.[25] This look was popularized by cinematographers such as Haskell Wexler (who consulted with Lucas for *American Graffiti* in 1973) and William Fraker on *Bullitt* (1968) and in animated advertisements by the Robert Abel Company.[26] This reflective, neon-lit (and highly stylized) look was motivated in the *Star Wars* films by the light sabers and laser beams, as well as in most of the interior spaces. The candy apple neon look, coupled with 1970s poetic docurealism, add up to what Lucas and others frequently described as an imperfect, abraded, "used future" aesthetic, which has long strongly informed ILM's conception of photorealism.[27] ILM's techniques enhanced and exaggerated the marks of "photographedness" of 1970s live action cinematography into a flexible house style that has remained remarkably consistent over the years, despite broad technological changes. This style looked strikingly "realistic" (compared to past special effects driven films) because they carefully rep-

Figs. 4 and 5. 1970's cinematography, as seen, for example, in Hal Ashby's *Harold and Maude* (1971), lends historical integrity to Steven Spielberg's *Munich* (2005).

Fig. 6. In *Iron Man* (2008), visual cues trick the eye into perceiving both live action and computer-generated content as similarly realistic.

licated the up-to-date trends in visual design that screamed "futuristic" but were also grounded in "realistic" gritty 1970s cinematography.[28] This flexible approach is evident, for example, in *Avatar*, where the ILM artists subtly tweaked the ILM environments to smoothly match the motion capture Na'vi animated characters developed by Peter Jackson's effects house, Weta.[29]

Recognizing ILM's aesthetic dominance also points up the question of what special effects stylistic possibilities ILM has foreclosed. The success of *Star Wars*, *Close Encounters*, and other special effects-driven late 1970s films meant, for a brief period, a proliferation of effects styles and approaches. There are several examples of foreclosed possibilities: *Altered States* (1980) and its sustained representation of trippy mind states; *Xanadu* (1980) and its colorful representation of heighted emotionality via music; *Flash Gordon*'s (1980) vibrant, op art comic book graphics; *Clash of the Titans* and its endearingly creaky traditional stop motion animation; and *Tron* (1982), which dared to actually imagine what computer generated imagery would look like if a computer had its way. These styles, all alternative approaches to special effects aesthetics that emerged in the late 1970s and early 1980s, enjoyed brief vogues, but were effectively crushed by the overwhelming success of early 1980s ILM produced effects in *The Empire Strikes Back*, *Return of the Jedi* (1983) and *Raiders of the Lost Ark*. By the mid-1980s, alternative special effects styles in mainstream cinema were available only for comedies, such as *Ghostbusters* (1984), and as minor narratively-motivated accents, as in *The Terminator* (1984).

Another important consequence of ILM's photoreal aesthetic is that the dominance of special effects production eventually meant that it effectively reversed the design priority in blockbuster filmmaking. Instead of requiring special effects to match the live-action cinematography, as was the case with *Star Wars*, the priority eventually reversed. With the greater economic importance of the special effects driven blockbuster, the live action cinematography is now conceived and executed (and in many cases also animated) to match the special effects considerations – as was certainly the case at ILM with the *Star Wars* prequels. Other prominent recent examples include *Mission: Impossible III*'s (2006) spreading colored lights and wobbly camera, and the chromed and glowing reflective surfaces of the giant robots in *Transformers* that serve as the visual template for the lighting in the live action sequences, often lit from the glow of computer screens.

I would like to conclude with a look at *Munich*, a film for which ILM was the lead special effects house. In a sequence where issues of photorealism

come to the fore, Mossad agent Avner (Eric Bana) is at what is presumably the Sunday family lunch at the chateau of the secretive arms dealer "Papa" (Michael Lonsdale), hoping to solicit his aid (and weapons) for future Mossad missions in the wake of the Olympic assassinations. Although this particular sequence does not use any significant effects beyond the digital intermediate (to my knowledge), it simultaneously sums up both the stylized 2000's ideal of 1970s cinematography and the impossibility of recapturing it with contemporary techniques. It also demonstrates the extent to which the 1970s cinematographic aesthetic has permeated non-effects driven projects, but is nevertheless still used to suggest the integrity of what we see and are to believe.

Appropriate to its historical setting, the sequence is shot (by cinematographer Janusz Kaminski) to evoke the cinematography of 1970s films, both American and European, such as *Day of the Jackal* (1973), *The Conversation* (1974) or, improbably, *Harold and Maude* (1971). In *Munich*, the sparkling dancing sunlight created by the dispersal of white flares enlivens and distracts the eye by moving it around the picture plane. The glow and reflections of the lighting blow out some areas of the field of vision, and knock down the color contrast, creating a soft, gauzy sheen punctuated by highlights. At the same time, the resultant reflective and luminous cinematography suggests a dreamy "out of time" subjectivity to the 1970s-inflected mise-en-scène. By portraying the anti-government arms dealer as a benign patriarch surrounded by the trappings of haute bourgeoisie with roots in the (Christian) French resistance who "doesn't do it for the millions", but does what he must "for his family", the sequence effectively recenters the film's discourse towards patriarchal responsibility and the protection of one's home. The sequence appears at a point in the movie where the ethics of Avner's team's mission (hotly debated throughout the film) are most in doubt, and Avner (and the audience) is most in need of reassurance that what they are doing is right. Also, within a film that is "based on historical events", this episode is probably the film's most speculatively fictional and most in need of grounding in visual realism. Spielberg and Kaminski create a discourse through the visual aesthetic of 1970s cinematography in which the light patterns mobilize the focal points and distract from the historical liberties taken with what we are seeing and hearing. It is a strategy that works equally well for Spielberg rhetorically – as in those cases where Spielberg uses ILM's special effects to make us believe that, say, dinosaurs once again roam the Earth.

Munich's rhetorical strategy only works due to decades of visual conditioning brought about by ILM's photoreal special effects aesthetic.[30] Taking the nighttime climactic faceoff between Tony Stark (Robert Downey Jr.) and Obadiah Stain (Jeff Bridges) in *Iron Man* as another example, much the same lighting effects, focus tricks and low contrast colors are used. With each battling the other in metallic suits, the strategy of the cinematography and camera work is to move the eye around by playing light over the chrome and metal of the hardware in order to keep the eye busy, so as not to look too closely at the wholly artificial effects objects. Also, the low light and the post-production "color timing" provided by the digital intermediate give a textured look to the entire negative, leveling and homogenizing the principal photography and the hard edges of the CGI element. In *Iron Man*, the very confusion or slippage between what is live action photography and what is computer generated, and the smooth transition between them, is exactly what tricks the eye into cuing what it sees as "perceptual realism". Within these imaging tactics, *Munich's* 1970s aesthetic plays an unexpectedly similar role. The same photoreal techniques special effects artists use to convince us that what we are seeing is all of the same veracity are used to add integrity and heft to Spielberg's account of historical facts, as well as his interpretation of them. The association with special effects photorealism, combined with the poetic docureal cinematography, produce a credible world where Spielberg's version of history is true, because it looks and feels true. This look is as true as *Badlands* (1973), to be sure, but perversely, also as true as *Iron Man*.

Given the vague "does it look real" definition of good special effects, identifying, historicizing, and most importantly, deconstructing the aesthetic of photorealism – in particular ILM's photorealism – should be a central project for film studies today. Certainly, no area of cinematic production clings so obviously to the "photo" in photorealist aesthetic as the special effects business. It is easy to call this impulse a smoke screen, designed to sooth our anxieties about digital representation, but I believe it is motivated beyond what we might call a simple remediation impulse. The particular photoreal aesthetic in special effects persists, I believe, exactly

because of the emotional associations with the photographic veracity of the original model of 1970s documentary-style photorealism. This aesthetic almost literally builds in visual integrity and provides credibility on a number of levels. We can be comfortable believing what we see.

Finally, the perceptual world building of the photoreal effect is not the world viewed of Stanley Cavell, with photography's privileged relationship to the "world" as we think we experience it, but instead reveals what has always been latent in cinema, the ability to create diegetic environments wholesale with a combination of animation and photography. Intensified but not created by digital technology, cinema can construct from scratch a fully imaginary fantasy world, an historical period, or a seemingly naturalistic contemporary world. Deconstructing the ILM version of photorealism reveals the central role of special effects in forming a contemporary notion of photorealism over the course of cinema history, and not just as a recently important phenomenon. It also means we cannot dismiss special effects practice as exceptional. Lastly, it should give us pause that the marks of 1970s cinematography meant to disrupt a classical sense of seamless realism are entirely absorbed into a mental schema invoking photorealism, and moreover, signaling the truth.

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Notes

1. For more on this topic see Julie Turnock, "From *Star Wars* to *Avatar*: Contemporary Special Effects, Industrial Light and Magic, and the Legacy of the 1970s", in Murray Pomerance and John Sakeris (eds), *Popping Culture* (Boston: Pearson Education, 2010; 6th edn), 301–311 and Julie Turnock, *Plastic Reality: Special Effects, Art and Technology in 1970s U.S. Filmmaking.* (PhD diss., University of Chicago, 2008).
2. Certainly, not all elements of 1970s filmmaking are part of the photorealistic aesthetic – for example, Scorsese's Godardian jump cuts, or Altman's sound perspective or slow zooms. Instead, effects artists prioritize 1970s techniques that suggest hand-held footage shot on the fly in natural light.
3. Tom Gunning, "Moving Away from the Index: Cinema and the Impression of Reality", *Differences* 18.1 (2007): 29–52 and "What's the Point of an Index? or, Faking Photographs", *Nordicom Review* 1:2 (2004): 39–49. Also see Philip Rosen, *Change Mummified: Cinema, Historicity, Theory* (Minneapolis: University of Minnesota Press, 2001) and John Belton, "Digital Cinema: A False Revolution", *October* (Spring 2002): 98–114.
4. Andrew Johnston, "Pulses of Abstraction: Episodes from a History of Animation", (PhD diss., University of Chicago, 2011).
5. D.N. Rodowick, *The Virtual Life of Film* (Cambridge, MA: Harvard University Press, 2007) and Stephen Prince, "True Lies: Perceptual Realism, Digital Images, and Film Theory", *Film Quarterly* (Spring 1996): 27–37.
6. Rodowick, 53.
7. Some definitions: matte paintings (paintings combined with live action footage, animation, or models to produce a realistic composite image); miniatures (scaled models which are photographed to look full scale); traveling matte compositing (a composite technique used to combine two separately filmed elements when the foreground element, such as a person, changes shape or position from frame to frame, necessitating a new matte for each frame); rotoscoping (tracing film images projected onto paper or cells, as a basis for lighting, ghosts, or other hand animated effects, with the artwork then rephotographed and optically combined with the original footage). For more details see Richard Rickitt, *Special Effects: The History and Technique* (New York: Billboard Books, 2000).
8. See David Bordwell and Noel Carroll, *Post-Theory: Reconstructing Film Studies* (Madison: University of Wisconsin Press, 1996).
9. Stanley Kubrick's *2001: A Space Odyssey* (1968) is of course also an important precedent, particularly in how it makes use of lens flares as special effects "camouflage". For a discussion of the effects in *2001* see Herb Lightman, "Filming *2001: A Space Odyssey*", *American Cinematographer* (June 1968): 412. Also, as George Lucas says in a 1977 interview, "Technically, you always compare things against *2001* … . We didn't go in and say that we were going to make the perfect science fiction film, but we're going to make the most spectacular thing you've ever seen". Stephen Zito, "George Lucas Goes Far Out", reprinted in Sally Kline (ed.), *George Lucas: Interviews* (Jackson: University of Mississippi Press, 1999): 50.
10. See Richard Maltby, *Hollywood Cinema: An Introduction* (Oxford: Blackwell, 1995); Thomas Schatz, "The New Hollywood", in Jim Collins, Hilary Radner and Ava Preacher Collins (eds), *Film Theory Goes to the Movies* (New York: Routledge, 1993); and Steve

Neale, "New Hollywood Cinema", *Screen,* Vol. 17, no. 2 (1976).

11. For examples of this kind of rhetoric, such as *Star Trek* director J.J. Abrams on emulating *Star Wars*, see Joe Fordham, "A New Enterprise", *Cinefex* 118 (July 2009): 42. Also, see *District 9* director Neil Blomkamp as quoted in the *District 9* DVD extras. For negative judgment of *Clash of the Titans* (which is much more often remembered fondly, despite its effects appearing cheesy and outdated even when released) see Gillian Flynn, "Men and Myth", *Entertainment Weekly* (14 May 2004): 28 and Owen Glieberman, "*Clash of the Titans*: Are Special Effects Less Special in the CGI Era?", *Entertainment Weekly* (1 April, 2010). On *Dune*, which is called, "… a bad acid trip that refuses to end", see *Entertainment Weekly* (16 March 2012): 9.

12. Most of the histories of ILM have been written by authors who worked for that company. See, for example, Mark Cotta Vaz and Patricia Rose Duignan, *Industrial Light and Magic: Into the Digital Age* (New York: Del Ray Books, 1996); Pamela Glintenkamp, *Industrial Light and Magic: Creating the Impossible* (New York: Abrams, 2011); and Thomas G. Smith, *Industrial Light & Magic: The Art of Special Effects* (New York: Ballantine, 1988).

13. For shot numbers, see, John Dykstra, "Miniature and Mechanical Special Effects for *Star Wars,*" *American Cinematographer* (July 1977): 704 and Jody Duncan, "Cinefex Avatar: The Seduction of Reality" *Cinefex* 120 (January 2010).

14. Jody Duncan, op. cit.

15. See, in the discussion of *Transformers: Revenge of the Fallen* (2009), the emphasis on matching the cinematography to the needs of the effects crew in Jay Holben, "Robots Run Rampant", *American Cinematographer* (August 2009): 54–57. For an extreme case, regarding *Avatar*, see Jay Holben, "Conquering New Worlds", *American Cinematographer* (January 2010): 35–47.

16. Roger Deakins, ASC, BSC, assesses the Arri Alexa digital camera thusly: "… a very intuitive, film-based system – it really feels like a film camera", in Jay Holben, "Time Bandit", *American Cinematographer* (November 2011): 34.

17. In a discussion as to why digital imaging clings to the photographic as a model for replication, Rodowick makes a telling rhetorical move in explicating what he calls "the paradox of perceptual realism". He turns to Stephen Prince's definition of perceptual realism: The "Perceptually realistic image … structurally corresponds to the viewer's audio visual experience of three-dimensional space. Perceptually realistic images correspond to this experience because filmmakers build them to do so. Such images display a nested hierarchy of cues which organize the display of light, color, texture, movement, and sound in ways that correspond with the viewers own understand of these phenomena in daily life". Rodowick, 102.

18. The term photorealism was initially popularized in art history in reference to paintings (and prints) executed to mimic a photographic aesthetic, but can be productive in discussing the particular aesthetic of realism I'm proposing. In art history, the term typically describes mid-century painters and graphic artists such as Richard Estes, Chuck Close, Ralph Goings, and others who created paintings and prints that initiated an ontological play on the perceptual cues of photography, featuring purposefully banal and quotidian subject matter like a diner still life with napkin holder and ketchup bottle, or a row of chrome telephone booths, along with cropped, haphazard-looking framing. While art historical photorealism depends upon the recognition of an intellectual play on medium specificity, cinematic photorealism depends upon the erasure of the technique, which is typically a seamless depiction of a coherent diegesis.

19. Harrison Ellenshaw, "Creating Matte Paintings for EMPIRE", *American Cinematographer* (June 1980).

20. For effects artist rhetoric, see Joe Fordham, "*The Hulk*: Green Destiny", *Cinefex* 94 (July 2003); for an account that brings cinematography into the discussion, see Jody Duncan "The Unusual Birth of Benjamin Button" *Cinefex* 116 (January 2009).

21. For an articulation of Edlund's and Muren's photoreal aesthetic, as deployed on *Star Wars* and *The Empire Strikes Back*, see Richard Edlund, "Special Visual Effects for *Empire*", *American Cinematographer* (June 1980): 552; Paul Mandell, "Tauntauns, Walkers, and Probots", *Cinefex* 3 (December 1980): 4; Don Shay, "Of Ice Planets, Bog Planets, and Cities in the Sky", *Cinefex* 2 (August 1980): 4. See also Paul Mandell, "Richard Edlund: Second Effects Cameraman", *Cinefantastique,* vol. 7, no. 1 (1978): 17–18, and "Dennis Muren: First Effects Cameraman", *Cinefantastique* vol. 7, no. 1 (1978): 21–24.

22. For discussions of "New Hollywood", see Neale, "New Hollywood Cinema", and Schatz, "The New Hollywood".

23. Richard Edlund, special effects supervisor on *The Empire Strikes Back:*

> [Our approach to motion control] allows the human being to program the move. When the mathematician programs the move, it comes out in a perfectly mathematical parabola. The shot is so perfect that it is not interesting. The trajectories are all perfect – and predictable. On the other hand, if you enter the human element into it – which is what you'd really prefer if you wanted the material you are photographing to have something of the look of a guy out there with a

hand-held Arriflex shooting it – then you want a certain suspense. It would be very peripheral; you wouldn't really understand it; you wouldn't know why it was there – but you would know that the shot had not been done by a machine. Therefore, your material would have an effect that is altogether different from that of material that as been programmed mathematically. Not that there aren't certain cases in which you would want to use mathematically based material … . But in our operations we tend to lean towards the human operator interface.

From Richard Edlund, "Special Visual Effects for *Empire*", 565.

24. The stop motion animation technique called "Go-motion" (developed for *Empire*) also enhanced the irregularity of the motion. Don Shay, "Of Ice Planets, Bog Planets, and Cities in the Sky".

25. "Candy apple neon" was a term used often by special effects artists in the late 1970s, including Richard Edlund, in Pat Broeske, "Wizardry of Edlund Has a Special Effect", *Los Angeles Times* (21 September 1986): 43. It is also used by Jeff Carpenter and Robert Blalack in Anthony Brandt, "Masters of Illusion", *Quest* (June 1980).

26. As reported by Richard Winn Taylor (Abel and Associates employee) in an interview with the author (Marina del Rey, 18 July 2007) and Don Shay's interview with Richard Edlund in *Cinefex* 2, op. cit.

27. As George Lucas put it: "The trouble with the future in most futurist movies is that it always looks new and clean and shiny … . [W]hat is required for true credibility is a *used* future … . We were trying to get a cohesive reality. But since the film is a fairy tale, I still wanted it to have an ethereal quality, yet be well composed and also, have an alien look." "Behind the Scenes of *Star Wars,*" *American Cinematographer* (July 1977): 701.

28. For the1990s *Star Wars* prequels, ILM tried to update the look of the original films with an aggressively animated look resembling digital animation, to mixed reception.

29. Jody Duncan, 145.

30. I would say this is true as well for *There Will Be Blood* (2007) and *Zodiac* (2007). Also, to an extent, Christopher Nolan's insistence on large format photography on his *Batman* films works from, I believe, a similar logic, but with a different photographic aesthetic. Rather than going for a naturalistic 1970s aesthetic, Nolan seems to prefer a photographic aesthetic that is more of a rationalized, sharp focus, architectural (almost Miesian) modernism.

Abstract: The ILM Version: Recent Digital Effects and the Aesthetics of 1970s Cinematography,
by Julie Turnock

Rather than duplicating a transhistorical notion of "perceptual realism" based on the phenomenal world, contemporary digital imaging imitates the look of photography – specifically, the look of 1970s cinematography. This is largely due to the historical dominance of one special effects company, Industrial Light and Magic (ILM), which developed a photorealistic special effects aesthetic to match the live action photography of the originaol *Star Wars* trilogy. Over time, that particular aesthetic hardened into a powerfully convincing house style. Given the prominence of ILM in the film industry, denaturalizing the ILM aesthetic is crucial to understanding how digital images evoke "authenticity" or "veracity".

Key words: Special Visual Effects; Realism; 1970s Cinema; Industrial Light and Magic; George Lucas; Steven Spielberg; *Munich* (2005).