Reality, Simulation and Presentationism: the Transubstantiation of Digital Moving Images

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Abstract

Alongside the synthesis of analogue and digital technologies employed in the creation of digital cinema, particular genres of the moving image have sought to foreground the materiality of digital technologies. Science fiction film is one genre that pointedly offers an amalgamation of hybrid moving images. This combination consists of *referenced photorealistic moving images*; those that audiences recognise, having seen their real world counterparts or analogue photo references, alongside *fantastical photorealistic moving images*; those with no real world referents. Importantly for simulatory digital images, a new primary relationship focused on recognition is established in a correspondence model between image and reality. It is that between the image and spectator—mediated by perception—in addition to the relationship between the image and the reality it presents. Coupling the science fiction films *Tron* (1982) and *Tron: Legacy* (2010) offers a cogent display of these technological distinctions, highlighting the material and ontological properties of moving images and their relationships with reality.

Keywords:

Reality, simulation, digital moving images, Tron, Tron: Legacy, materiality, digital technologies, spectacle cinema, science fiction film, photo-realism, recognition

Introduction

One of the effects of the re-emergence of Tom Gunning's "cinema of attractions" as digitally enhanced spectacle cinema has been a de-emphasis of the previously foregrounded narrative aspects of cinema. Alongside this there has been an increased focus on audiences' direct interactions with the technologies of photographic reproduction and representation—at times approaching "technophoria" (Moszkowicz 2002, p. 302).

Robin Baker (1993) describes this approach as "if the quest for technological magic, exceeding the effects in previous movies, becomes the paramount concern" (p. 41). Additionally, Dana Polan (1986) attempts to corral the indistinctness of spectacle in cinema as "a containment, in which awareness of any realities other than the spectacular gives way to a pervading image of sense as something that simply happens, shows forth, but that cannot be told." (p. 56).

This paper examines the corresponding approach to this drive toward insularity in a technical production context and with a focus on the relationship between these images and their real world referents. This approach is in part a response to a habitually indiscriminating view of rapidly changing moving imaging technologies. As Ron Burnett (2004) argues, as spectators we are becoming increasingly less aware of the ways in which the material aspects of the images we create shapes our viewing experience.

From Representation to Simulation; Index to Icon

Audience engagement with specifically digital technologies in the production and reception of moving images ushers in a new era for photographic realism after almost a century of narrative cinema, during which time the photograph and photographic moving images were incontrovertibly *of reality* (Walton 1984). It is clear that digital cinema technologies have changed the way in which audiences and theorists regard the construction and presentation of the moving photographic image and its increasingly complex relationship to the real and photo-real. Achieving simulatory photorealism is now an incremental rather than threshold achievement.

This shift can be described as moving from representation to simulation and repealing the swing from showing to telling that defines early narrative cinema. Further, I argue in this paper that digital simulation is the embodiment of iconicity after Charles Sanders Peirce's (1867) taxonomy. Peirce's theory of the index is one of mediation and more specifically, identification through relational signs. Within a metonymic framework it attempts to describe the relationship between signs and their referents—'objects' in Peircian terms.

This approach intersects with many persistent arguments regarding the moving image including the distinction between the photographic moving image and other visual representation, the moving image as art, and arguments positioning the moving image within a formalist, or alternatively, realist framework. In more recent theory these frameworks often present indexicality in opposition to a semiotic reality-effect particularly within classic realism (Stam 2000, pp. 143-4). It also intersects with the wider concerns of pictorial representation by theorists and philosophers including Nelson Goodman (1968), Rick Altman (1984), Flint Schier (1986) and Kendall Walton (1984 & 1997).

In essence this scenario follows a drive from earlier forms of reproduction. Stanley Cavell's (1979) remarks on the naturalness of automatism in painting can be equally applied to the reality status of digital moving images in that both achieve "an old wish of romanticism—to imitate not the *look* of nature, but its conditions, the possibilities of knowing nature at all and of locating ourselves in a world… the conditions present themselves as nature's autonomy, self-sufficiency, laws unto themselves. ('Not *how* the world is, but *that* it is')" (p. 113).

Digital moving images discard the operations of Peircian indexicality and promote autonomous presentation. Most importantly, a Peircian iconic sign denotes its object because of a quality that is shared. But additionally, an icon has this quality independently of the object. This notion of digital presentationism extends Charles Musser's (1995 & 1991) argument for the presentational aspects of early cinema incorporating Gunning's (1989a) refutation of the primitiveness of filmmaking of this era and also renovates Michele Pierson's (1999) description of "formally bracketing the presentation" of Computer Generated Imagery (CGI) effects in Hollywood science fiction cinema of the early 1990s (pp. 165; 172). Pierson also notes Landon's (1992) argument for the real narrative of early digitally manipulated science fiction film—discussed below—as located in the *presentation* of the digital on screen, although this is at the service of simulation.

Here, the digital moving image "is construed as an iconic simulation—immaculate in its photographic credibility, yet always lacking an existential relation to the real" (Ng 2007, p. 173). Sean Cubitt (1999) in an emblematic argument writes that digital spectacle cinema "brings on marvel at the capabilities of the medium itself, throwing before the audience the specificity of the medium as well as a terminal form of illusion that succeeds by exceeding the apparent limits of the medium" (p. 129). Closing this loop, a view of digital moving images as spectacle is also an apt description for Musser's (1991) take on the presentational properties of early cinema.

Transubstantiation

I nominate this global change from representation, through simulation, to insular presentation, as transubstantiation. I employ this term rather than perhaps transfiguration, metamorphosis, transformation, conversion, or transmutation because this shift is one in which the appearance of moving images remains the same but their materiality is inextricably altered.

Transubstantiation accounts for the apprehension *and* the materiality of digital moving images in ways that other vocabularies cannot. It is equally for this encompassing of both perception and materiality that transubstantiation is not applied to analogue electronic images, as there is a perceptual change that is readily observed. Analogue video and television images do not look like film images. Digital images however, through their mutability—or Yvonne Spielmann's (2008) "optionality"—can present as, masquerade, or impersonate the visual appearance of any moving image technology (p. 49).

Simulation as part of this process is defined after Friedrich Kittler (2010) and Spielmann (1999a & 2008) as the

> *physical processes that create visibility—such as the registration of light rays, or chemical and mechanical manipulations—are copied or duplicated in a type of fakery which pretends (simulates) that we are still dealing with the actual photography of film. But, on the contrary, what is actually manifested is the dissolution of the factual. (Spielmann 1999a, p. 135)*

Scott McQuire (2000), Miriam Hansen (1991), Gunning (1986; 1989; 1989a; 1993; 1994), André Gaudreault (1987), and Musser (1995 & 1991) all note a return to *showing* when describing a link between the spectacle of contemporary cinema and "cinema in the 1900s, with people going to see the apparatus rather than a specific film, and the 'experience' being advertised largely on this basis" (McQuire, 2000, p. 54). Pierson (1999) in acknowledging CGI of the early and mid 1990s as a re-finding of this cinema of attractions prefigures Andrew Darley's argument regarding the role of spectacle in "halting motivated movement" (Darley 2000, p. 104). Pierson describes 1990s CGI in terms of visual excess. It is

> *too bright and shiny by far, the hyper-chrominance and super-luminosity characteristic of the CGI effects produced over this period imbued the digital artefact with a special visual significance. This visual significance was augmented by a style of arts-and-effects direction that, by bracketing the computer-generated object off from the temporal and narrative flow of the action, offered it up to the contemplative gaze of cinema audiences. (p. 173)*

In support of digital mutability and transubstantiation, audiences largely do not distinguish between analog and digital materiality if presented with unspectacular referenced photorealism when relying on moving images as evidence of reality. This can be seen in a plethora of political documentaries employing digital video cameras that rely on afilmic moving images as evidence. Examples of these works include *The Cove* (2009), representing the capture and killing of dolphins for meat in the small Japanese harbour town of Taijii, South of Kyoto, and *Voices of Iraq* (2004) in which the Iraqi subjects of the film were loaned up to 150 consumer digital video cameras and recorded themselves on location during the Iraq war. Unchallenged, these moving image works present actuality footage—digitally captured and edited—as reality in perceptually the same way their film counterparts offered moving image certainty in previous years. Materially though, these digitally generated films are distinct from film-based actualities, particularly for the relationship they have with reality. The technology employed to render these images is optically cinematographic in reception but synthetic in its construction.

Importantly, part of the digital creation and recreation of photorealism involves simulation. What is being simulated by digital technologies as photochemical film—the benchmark of reality—however, is the *photograph of* reality, not just the scene the reality depicts.[1]

Lev Manovich (2001) takes up this point arguing that "what is faked is, of course, not reality but photographic reality, reality as seen by the camera lens. In other words, what computer graphics has (almost) achieved is not realism but only *photorealism*—the ability to fake not our perceptual and bodily experience of reality but only its photographic image" (p. 200). This is part of Manovich's larger argument that technology has only achieved simulation of "film-based" reality rather than Souriau's profilmic or afilmic reality (Buckland 2000, p. 47).

Despite the monumental transformations to image making and reception facilitated by contemporary technologies, a preoccupation with perceptual apprehension as a method for discerning indexical veracity continues for considerations of the relationship between digital moving images and reality, but is now destabilised. The digital filmic object wanes and finally, the largely historically unacknowledged materiality of moving images of the twentieth century is belatedly foregrounded alongside its expiration in another *trucage* of technologically mediated spectacle cinema.[2]

The result of this revelation is a renewed focus on the ever-diminishing substance of moving images. The prompt of the intangibility of digital images allows materiality to share centre stage with perceptual realism at the close of the twentieth century and into the twenty-first. With the absence of a filmic referent however, apprehension segues into a defining position alongside a reconfiguration from a correspondence model that valorises connections between image and referent to one that now unites image and viewer in an insular fashion. What had been previously a dichotomy between ontology as represented by materiality, and phenomenology through apprehension, is displaced by the absence of indexicality in conjunction with an absence of materiality in digital images.

The essence of digital filmic reality is now a contract of apprehension between the moving image and viewer. Illustrative of the mutability of digital media, the specific digital images discussed in this paper are combinative in that they can be composites of pro-filmic reality and synthetic construction; simulative in that they are clearly Peircian icons rather than indices; allusory in that they are autonomous rather than directly referenced, and assimilative in construction. I argue that these components of digital images synthesise in a mode of self-contained presentationism.

Insularity and Science Fiction Film

Particular genres of moving images can be seen to foreground the materiality of digital technologies. Science fiction film pointedly offers an amalgamation of *referenced photorealistic moving images*—those that audiences recognise, having seen their real world counterparts or analogue photo references, alongside *fantastical photorealistic moving images*—those with no real world referents. I argue though, that much of the seemingly non-referenced imagery extensively employs extrapolation techniques through virtual physics engines determining the properties of gravity, collision detection and fluid dynamics to offer more perceptually realistic depictions of fantastical images. It is recognition as phenomena that privileges perceptual realism without indexicality; that promotes photorealism without referent. It is recognition that allows perceptual realism to operate as an essential component of the materiality of digital moving images. This preserves the insularity of these images and simultaneously renders their transubstantiation.

Albert La Valley (1985) succinctly defines science fiction film as "fantasy as a form of technological speculation" (p. 144). Science fiction film audiences accept that they are no longer looking at a recording of a profilmic event. An acceptance of the science fiction genre is an acceptance that what is presented is not entirely of reality. Pierson (1999a) argues that:

> *In the early part of this decade [1990s], it was… science fiction cinema which made the public and social screening of the computer-generated image an occasion for speculation about the future of cinema itself. Much of this speculation focused on the question of how long it would be before digital imaging technologies had totally replaced physical and mechanical effects. (p. 29)*

This resonates with the arguments of Cubitt (2010 & 2004) and Scott Bukatman (1995) regarding the insular essentialism of digital moving images. Bukatman (1998), in a later text, further argues that "the experience produced by many effect sequences in science fiction cinema is one of hallucinatory excess as the narrative yields to an abstract, kinetic spectatorial experience that exists apart from its representational function" (p. 255). An earlier articulation of this position can be found in Cubitt's criticism of Jean Baudrillard's (1983) position on simulacra: "yet the disappearance of truth in signification, which he [Baudrillard] equates with the loss of reality, concerns only one aspect of the sign: its reference. What remains is the communicative" (Cubitt, 1999, p. 124).

Cubitt advances this argument through an examination of the writing of Paul Virilio, Gianni Vattimo, and Dudley Andrews' "expression", concluding that "in the cinema of special effects, the matter of the communication is then not an external referent but the relationship instigated between the film and the viewer" (ibid, p. 126).

Additionally, the self-reflexive nature of science fiction film utilising digital technologies makes it an ideal candidate for the exploration of the role of technology. Pierson describes particularly early digital science fiction as cinema that "shimmered with a special reflexivity". Brooks Landon's overarching argument in the second part of his 1992 book *The Aesthetics of Ambivalence: Rethinking Science Fiction Film in the Age of Electronic (Re)Production* is that digital technologies are transforming science fiction film and also our relationship to science fiction. The narrative of technology and more specifically, motion picture technologies is more compelling than the stories it presents. Bukatman (1990) writing of the legacy of science fiction texts argues that:

> *Representation and textuality become the explicit subjects of the text; discourse will comprise the content as well as determine textual form. The inherent rhetoricity of the genre is extended as the text turns in upon its own production and status. The science fiction of the spectacle often demands the recognition of its own imbrication in the implosion of the real. (p. 200)*

As La Valley (1985) notes after Steve Neale (1980), the "principle aim of science fiction movies is to illustrate the 'state of the art', to be in essence an advertisement by cinema for itself" (p. 148). This view pre-empts a broader argument offered by David Rodowick (2007) that "films themselves tend to stage its [film theory's] primary question: *What is cinema?*" (p. 9). Bukatman similarly (1998) describes this concern as: "the meaning of science fiction films is often to be found in their visual organisation and in their inevitable attention to the act of seeing, and this is where special effects begin to take on a particular importance" (p. 250). He also contextualises this view, anticipating Rodowick's observation, in noting that:

> *The special effects of contemporary cinema are a recent version of centuries-old spectacular technologies that moved towards immersive and apparently immediate sensory experiences, such as monocular and elevated perspectives, panoramas, large-scale landscape paintings, kaleidoscopes, dioramas, and the early "cinema of attractions". (ibid)*

Pierson (1999) argues as part of a partially dissenting position that this reflexivity has early digital Visual Effects (VFX) in science fiction film "pulled, on the one hand, towards photographic realism, and, on the other, towards a synthetic hyperrealism, the computer generated imagery in this cinema exhibits an aesthetic that plays across these two poles" (p. 172).[3] Pierson (1999, 1999a & 2002) also argues that it is the electronic reconfiguring of the cinematographic image which gives CGI effects in these films their special reflexivity.

Significantly, Pierson transposes the emphasis of her argument from a broadly accepted position that considers the genre of science fiction cinema as self reflexive to one in which this self reflexivity belongs to the VFX within digitally realised science fiction film. Pierson (1999) and Hayward & Wollen (1993) nominate this as a "techno-futurist" aesthetic that highlights the synthetic in early digital VFX and offers a "presentationist" style (Pierson 1999, p. 158; 1999a, p. 36). It is important to note however that "the photographic realism of any age assumes quaintness or distance as soon as 'improvements' achieve fresh immediacy: our notions of the 'real' are changed by the 'realisms' which supersede each other to represent it" (Hayward & Wollen 1993, p. 2).

Cubitt (2004) promotes distinctions between CGI and compositing in citing Bukatman (1998) and Pierson's (1999 & 1999a) call to consider the synthetic properties of "electronic imagery" alongside the "aesthetic project" that is "geared towards simulation" (Pierson 1999 p. 158). Problematic now, given contemporary compositing, Cubitt argues for an "ethical dimension to the choice" to use miniatures for example, rather than CGI. The distinction is that these miniatures can then be composited with other optical footage to create a seamless vista. Cubitt argues that this move to VFX "corresponds to a shift away from spectacle toward simulation of reality" (p. 258). However, in recent compositing practice, a substantial proportion of the work of spectacle is in blending multiple CG images, not analogue with digital assets.

The practice of digital compositing, particularly in marquee Hollywood feature films, is now oriented toward synthesising a disparate group of analogue and increasingly now, exclusively digital image assets. The in-principle notion of combining optical footage shot on film with a digital backdrop or even as Cubitt notes, enhancing profilmic footage with digital tools is no longer the dominant model that it was when Cubitt wrote this. Digitised analogue images are spatially manipulated, colour corrected and otherwise tweaked in preparation for compositing in similar ways that complementary digital assets are.

Compositing is certainly a distinct art within CGI VFX processes, perhaps even more so now than in 2004, but it has not continued to respect a focus toward simulation over spectacle. The focus is on synthesis, as it had been previously, but now this synthesis is concerned with bringing together a concoction of disparate 2D planes while preserving perceptual depth, not in blending the digital with an analogue truth.

Tron and its Legacy

Writer/Director Steven Lisberger's *Tron* (1982) and Joseph Kosinski's *Tron: Legacy* (2010) are an entwined pair of science fiction films that offer a compelling illustration of the successive technological shifts of imaging technology in their depiction of the same virtual diegetic environment through predominantly analogue and digital technologies respectively. Alongside this lineage however, there is an important break in visual aesthetic that speaks to the new nature of digital images and highlights the implications of incremental photorealism and densely layered referentiality.

Tron (1982) charts the journey of Kevin Flynn; performed by the actor Jeff Bridges, as he is digitised and forced to defend himself in a virtual world—the Grid—as part of a series of gladiatorial contests engineered by a malevolent master program. The reward for succeeding in these games is an opportunity to outwit the program and return to the real world. The film presents a self-reflexive visual aesthetic that interacts with the then vanguard potential of CGI for moving images, in part through depictions of virtual CG environments representing the Grid. Vivian Sobchack (1988) writing of the film, nominates

> the "deep" and indexical space of cinematographic representation [as] deflated—punctured and punctuated by the superficial and iconic space of electronic simulation. This deflation of deep space, however, is presented not as a loss of dimension, but rather as an excess of surface. The hyperspace of these films is proudly two-dimensional—even in its depiction of three-dimensionality… It thus presents itself as "more visible" than the cinematographic image, less clouded by atmosphere. (p. 256)

Lisberger's *Tron* (1982) is arguably the first commercial feature film to employ digital visual effects, integrating between five and sixteen minutes of digital effects but using analogue cell animation for the majority of the film's visual effects.[4] This "extensive use of computer graphics" was a major selling point for the film despite the small duration of finished film work that CGI created for the film; "gone with *Tron* are the days of fairy dust, Jiminy Cricket and lisping ducks" (Hutchison 1982, p. 73; Salkin & Stone 1982, p. 20).[5]

Recalling the mutability of digital visual aesthetics, a new electronic aesthetic was promoted by *Tron* that represented computer imaging and did not dwell on the fact that older analogue cell animation techniques were employed to create the bulk of this vision. Fan magazines of 1982 consistently summarised the digital technologies used to create the VFX for *Tron* as "true", "real" and "perfect" alongside accounts of the huge numbers of pixels, frames or calculations required (ibid).

Twenty-eight years on, *Tron: Legacy* (2010) focuses on believable and recognisable moving images rather than just the conundrum of simulating virtual reality—and does this in stereo. The recognition is to both referenced and fantastical photorealism but also to the earlier *Tron* (1982) film. Both films offer computer-simulated environments that are cast against the *real* world but the later film adds an insular essentialism through a complex layering of visual representation and full digital production.[6]

In a material layering of visual illusion and immediacy, *Tron: Legacy* (2010) is a film that conjures a new *trucage* beyond the spectacle of nineteenth century trick-films and Gunning's aesthetic of astonishment. La Valley (1985) describes the effect of the *old* trick as the audience

> *see[ing] something we know cannot happen, we know it is a lie and a trick, but we delight in the illusion, even giving it some credence—certainly within the narrative. But finally we give as much or more wonder to the machine which can produce this illusion and of which we are highly conscious. (p. 147)*

Almost twenty years later however, Cubitt (2004), regarding science fiction film and Bolter And Grusins' (1999) "hypermediacy", offers a new iteration of the trick: "this is magical, but it is neither the magic of the illusion of life, nor of the awareness of trickality, nor yet of the endlessness of the graphical vector: rather it is the delight in the illusory perception of illusion" (p. 256).[7]

With reference to Pierson's (1999) earlier quote, it is clear that in contemporary CGI, the new tricks of VFX are no longer bracketed off and are increasingly either invisible or alternately imbricated and enmeshed in ways that promote Cubitt's and Bukatman's (1995) views of insular essentialism (p. 173). Pierson nominates this as "a hyperreal electronic aesthetic that takes the cinematographic image as its point of departure" (p. 171).

Also in support of an unanchored presentation, and particularly fitting for the fantastical in science fiction film, Laura Mulvey (2004) argues that occluding the profilmic event is essential for the success of narrative film:

The autonomy and credibility of a narrative world, its diegesis, depends on a successful representation of its story-time which, in turn, depends on the suppression of the moment of inscription, the presence of the past moment at which the film image was registered. (p. 145)

Inverse Depth and Doppelgangers in *Tron* and *Tron: Legacy*

The earlier *Tron* (1982) employs markedly different looks for the two environments—real and virtual—through contrasting practical art department looks for the real world with predominantly cell animation techniques for the virtual environments. Sobchack (1988) argues that the "hyperreality of electric simulation" in *Tron* visually depicted as a space in which depth is collapsed, functions to attest to its distinction from the "older model of 'deep' space, affirming the latter's contours, texture, and thickness as the primary ground for human movement and existence" (p. 261).

Conspicuously, *Tron: Legacy* (2010) reverses this relationship in rendering these different realities. Real world scenes in *Tron: Legacy* were photographed and are presented flat—in 2D, whereas the virtual world of the Grid is presented stereoscopically throughout the film.[8] Rather than the breadth of excess surface to depict digitality cited by Sobchack for the earlier film, *Tron: Legacy* presents in its place, depth—achieved through stereoscopic photography and projection—and in doing so relegates the real world to a deprived perceptual flatness in 2D. This separation of 2D and 3-D presentations via the addition of selected stereoscopic camera rigs in production, 3-D VFX in post-production and stereo projection in theatres, styles the diegetic computer generated world as an inversion of Sobchack's argument describing the deflated and so flattened electronic space in *Tron*.

Whereas the virtual and occasionally digital produced realm in *Tron* (1982) is notable for its distinction from verisimilitudinous cinematographic representation, *Tron: Legacy* (2010) revels in a set of techniques that recall the Technicolour representation of the Land of Oz following the sepia-toned Kansas in Victor Fleming's *The Wizard of Oz* (1939) and also, as Cubitt (1999a) describes for the Wachowskis' *The Matrix* (1999): "the everyday material world becom[ing] banal and simulacral, the object of a subject whose subjectivity is lifted ... far above it" (p. 116).

This foregrounding of the technological new blurs the boundaries of moving image technologies and diegesis. Not only does *Tron: Legacy* render the real world perceptually impoverished, the new technology foregrounded is both within and outside of the diegesis, an extensively developed tactic that is discussed below. *Tron: Legacy's* promotion of a separation achieved through privileging excessive perceptual depth for the Grid when compared to the flat real world, is in Sobchack's terms—an "inflation"—but here an inflation of medium in addition to Sobchack's (1988) "excess scenography" as visible in, for instance, Ridley Scott's *Blade Runner* (1982; pp. 261-2).

In a precise allegory to the increasingly insular and ever more photorealistic evolution of digital VFX in the twenty-eight years between production of the two films, Kosinski describes his director's vision of the Grid in *Tron: Legacy* (2010) as having

> *been sealed off on a [computer] server 28 years ago, disconnected from the internet, and, like the Galápagos Islands, it continued to evolve in a closed system. That world continued to be refined for the equivalent of thousands of years in the computer, as opposed to the 28 years in the real world; and as it evolved, the simulations became more realistic, more visceral, and more physical. (quoted in Duncan 2011, p. 33)*

Sobchack (1988) considers the virtual world of the Grid, and particularly its inhabitants referencing only the earlier film but proving a valid observation for both works. This is after Bukatman's terminal identity; the subject as the terminal of multiple visual and digital information networks and also as bearing a new identity in the information age. "For most of the film, almost everything and everyone have mutated into a simulation, and the category of the 'real'… is short-circuited and loses power. Simulation seems the *only* mode and space of being" (p. 257).[9] The simulation that gives way to presentationism in *Tron: Legacy* (2010) amplifies Sobchack's "effect". It is one that presents as part of a hierarchy that begins with the simulation of the diegetic worlds of *Tron*; supported by the digital simulation of environments and actors; which are in turn, supported by the simulation of stereoscopic space on a 2-D plane; simulating unreferenced reality. These layers of simulation and their referents promote simultaneously a complex perceptual mimetic model and in resolution, an insular essentialism in an arrangement that recalls Bukatman's (1990) description of Philip K Dicks' novel *Ubik* (1969) in which "the reification of the real is replaced by a recursive structure of infinite regression" (pp. 208-9). This arrangement also recalls and offers an incremental escalation of Bill Mitchell's (1992) argument for interpictoriality:

> *The digital structures that are produced and consumed do not just refer to each other, they are actually made from each other, so that they form mirror mazes of interpictoriality hooked to the external physical world (at relatively few points) by moments of image capture. Images do not just mirror the world directly, as they once seemed to do, but reflect traces (perhaps tinted or distorted) of other images. (p. 52).*

I argue that in the appositely named *Tron: Legacy* (2010), Mitchell's "moment of image capture" is done away with and the "traces of other images" are now recognitions, not referents (ibid). The reduplication presented is one that breaks the bounds of the fictional narrative and interrogates the mimetic representation of a specific actor across both films. *Tron: Legacy* (2010) again features Jeff Bridges whose profilmic performance is recorded on digital film and then digitally manipulated but also a representation of his character's (and the actor's) younger self as a CGI head atop another actor's body; as a younger Flynn and the virtual character Clu. The film presents both a CGI character driven by the actor Jeff Bridges—Clu, who is a digital doppelganger for the younger Kevin Flynn, and also a digital doppelganger for Jeff Bridges from *Tron* (1982; see figs. 1 and 2 respectively).

Figure 1   **From Kosinski, J. (2010),** *Tron: Legacy* **[Motion Picture; BD frame grab]**

Figure 2   **From Lisberger, S. (1982),** *Tron* **[Motion Picture; BD frame grab]**

The audience is offered a 2010 manipulated digital representation of Jeff Bridges and also a 1982 version that blends profilmic and digital images of the actor. The mimetic believability of this character represented by two figures, one visibly twenty-eight years older than the other, is achieved by making the recognisable face of a marquee actor appear as he did in the same environment at thirty-five years old, alongside, and in a pivotal scene, against his performance as a sixty-three year old in the more recent film (see fig. 5).[10]

The VFX work for these sequences was undertaken at Digital Domain, and by the same team as responsible for the VFX work instrumental in creating the ever-more-youthful Benjamin Button as portrayed by Brad Pitt in David Fincher's *The Curious Case of Benjamin Button* (2008). In that film, more than half of the depictions of the titular Benjamin were CGI heads as the film charted the gradual inverse aging—or youthenizing, as the production team dubbed it— of the character. For example, all images of Benjamin in the first fifty-two minutes of the film use CG heads in representing that character ('The Science Behind…' 2009).

Unlike *The Curious Case of Benjamin Button* (2008) however, *Tron: Legacy* (2010) presents a sequence that is shared by visual representations of the character Kevin Flynn both as he appears in *Tron* (1982) and *Tron: Legacy* (2010). The mimesis is not only against other visual representations of the character within the same work but also against the earlier *Tron* film and more importantly within a context of degrees of reality, the same actor as he appeared twenty-eight years earlier. For *The Curious Case of Benjamin Button*, Digital Domain VFX Supervisor Eric Barba describes the goal as "not to create Benjamin's performance in animation, but rather to 'xerox' Brad Pitt's performance onto this CG head" (ibid). For *Tron: Legacy* the same team needed to visually create a digital doppelganger of the actor as he had appeared in 1982 to play opposite himself in the late 2000s (figs. 3-5). [11] As Jody Duncan notes:

> *As challenging as the Benjamin Button [2008] effects had been, the effects artists had benefited from the fact that nobody knew what an 85-year-old Brad Pitt would look like. In contrast, everyone knew what a 35-year-old Jeff Bridges looked like, which meant that audiences would recognize immediately if the digital character failed to re-create the actor in every detail. (2011, p. 30)*

Figures 3-5   **From Kosinski, J. (2010),** *Tron: Legacy* **[Motion Picture; BD frame grabs]**

In an acknowledgment that the digital Clu was a representation of Jeff Bridges rather than solely the character Kevin Flynn, (2010) Barba adds: "not only has everyone seen a young Jeff Bridges… but everyone has a different recollection of what he looked like. Some remember him best from *Starman* [1984], others remember him in *Against All Odds* [1984], others remember him in *Tron* [1982]—and he looks different in each movie!" (ibid, pp. 33-4).[12] Recognition here is more important that mimesis, representation becomes simply presentation, even through a tangle of visual references that are necessary to create it.

Despite Pierson's argument that the 'charismatic state of grace' regarding a focus on materiality ended in the mid 1990s, this choice to present Bridges playing opposite his younger self resonates with Pierson's argument regarding pre-1995 digital science fiction VFX, now updated to reflect the technological possibilities of 2010:

> *But in all of the films of this period, the presentation of key computer-generated images was geared towards suspending spectators' willed immersion in the action long enough to direct their attention to the display of a new kind of artifact. (p. 37)*

Interviewed by fan magazine *Starlog* in 1982, co-supervisor of visual effects on *Tron* (1982) Richard Taylor, espouses the wonder of digital graphics as simulation and as non-combinative. He also describes aspects of working with 3-D digital computer graphics to create "digital scene simulations" that read equally well when considering more contemporary CGI:

> *In computer animation… the object the computer creates (lightcycles, people, flowerpots etc.) are totally three dimensional and totally true to their reality—they have perfect perspective, they move accurately in space and there are no matte lines… in fact, there are no such thing as mattes. There are no limits to the physical objects which the computer creates. They can pass right through each other, they can metamorphasize, they can be transparent one minute, opaque the next. Also there is no limit to the point of view of the camera. You can be inside an object looking out, zoom out 100 miles in a flash or coast an inch above or an inch below the surface of the object. Anything you wish. (Hutchison 1982 pp. 75-6)*

Conclusion

I argue that this new mode of presentation displays an aesthetic of essentialism. This is achieved through transubstantiation with a shift away from the relationship between image and referent being the most recent *trucage* of moving images. This rendering contains elements of spectacle, simulation, and the assimilation of disparate elements to present a cohesive whole but at its core is insular and both the simulation and assimilation provided by digital technologies creates a new correspondence model that eschews real world referents and privileges subjective recognition.

Presenting digital moving images is then no longer solely about rendering images that mimic reality but also about creating perceptually believable and loosely recognisable self-contained realities though technology. There is no requirement for these images to engage with an indexical model of reality as this relationship is now centred on apprehension as a pact between image and viewer; no longer between image and reality.

End Notes

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[1] Rodowick (2007) describes this impetus toward an analog cinematographic aesthetic thus: 'a certain cultural sense of the "cinematic" and an unreflective notion of "realism" remain in many ways the touchstones for valuing the aesthetic innovations of the digital' (p. 11)

[2] *Trucage* here is employed here after Christian Metz (1977) and Sean Cubitt's (2004 & 1999a) interpretation of Metz. It refers pointedly to Metz's 'invisible *trucage'* (p. 664). Interestingly however, much twenty-first-century filmic *trucage* is closer to Metz's 'imperceptible trucage' or at least a blend of Metz's 'invisible' and 'imperceptible' *trucage*. (ibid, p. 663).

[3] In support of the argument regarding the mutability of digital media, Pierson (2002) in her subsequent book, *Special Effects: Still in Search of Wonder*, refers to this same pull as being between photographic realism and 'synthetic plasticity' (p. 128).

[4] Arguable in that Ridley Scott's *Alien* (1979) had already employed computer-generated images—to show a computer display of predominantly text characters. This can be argued as CGI self-reflexively representing itself in a mode that was acceptable to audiences of that time. The film also included a rudimentary wire-frame model of the planet that the spaceship was to land on, also appearing on only a computer display screen. Additionally, there were a number of films including Richard Donner's *Superman* (1978) that had used computer graphics within title sequences, separated from the main body of the film's imagery. This distinction is part of a larger concern with moving image production and the recognition of 'firsts'. Gaudreault (2007), for example, in deconstructing the 'single apparent shot' for Méliès' trick films notes that Edison was making trick films earlier than Méliès, but importantly, for pragmatic rather than illusory purposes (pp. 169-70).

[5] The volume of CGI work in *Tron* (1982) is debatable but at the upper end of estimates, Baker (1993) writes that there were 'sixteen minutes of completely computer-generated work (which was considerably less than originally intended) and many of the backgrounds for live action were also produced by computer' (p. 35).

[6] *Tron: Legacy* (2010) was shot on two models of digital camera rigs; the Phantom HD Camera, and the Sony CineAlta F35 recording to HDCAM/HDCAM SR digital formats. The production was mastered digitally in 2K and then distributed digitally for D-Cinema projection, as anamorphic 35mm film in 2D and 3-D, and as 70mm dual strip 3-D.

[7] Cubitt's reference to 'trickality' here is likely employed after André Gaudreault's (1987) use of the term in his essay on the unacknowledged specificity of Méliès' work.

[8] The exception to this approach is a flashback sequence on the Grid showing the construction of the film's virtual world and then the destruction of the Iso towers that prevent Flynn from returning to the real world. This is stylistically set apart from the other Grid environments to foreground that it is of a time past and is created as a flat CGI sequence in 2D. This sequence is selectively seen as a 2D image inside 3-D rendered space.

[9] Bukatman's 'terminal identity… refers both to the end of the traditional self and the emergence of a new self-definition constructed at the computer station or television screen' (Bukatman, 1998, p. 253). It, in turn, follows William Burroughs' (1964) use of the term in his cut-up novel *Nova Express*, and is attributed to Burroughs by Beat scholar Eric Mottram (1978).

[10] The triad of Kevin Flynn, his nemesis Clu, and Kevin's son Sam, played by Garrett Hedlund in *Tron: Legacy* (2010) is also evident in the framing and arrangement of the shots in this scene particularly. This sequence overtly comments on a generational relationship between the biological and the synthetic and also the 'legacy' of representation alongside reproduction.

[11] Some scenes in *Tron: Legacy* (2010) feature a CGI head atop another actor's body and others are full CGI creations known as 'synthespians' or 'vactors'. For more on the history of synthetic actors see Notaro (2009) and Causey (1999).

[12] A note bridging Barba's and Duncan's observations on subjectivity is made by Julia Moszkowicz (2002) regarding the rendering of Princess Fiona in *Shrek* (2001): 'no one knows precisely how dinosaurs moved, but everyone knows what a princess looks like' (p. 295).

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