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Cinema and the Unnarratability of Computation

Zara Dinnen

Michael Mann's 2015 *Blackhat* failed at the box office. Rotten Tomatoes reports the reviewers' consensus of *Blackhat*--an action conspiracy thriller all about hacking and networked systems--as 'thematically timely but dramatically inert'. Of interest in this chapter is the dramatic inertia of hacking and computer programming, and in particular the generative tension produced when the banal processes of programming appear as narrative cinema. This chapter argues that whilst code itself appears antithetical to narrative cinema, conforming to the unnarratable conditions of the supranarratable (Warhol 2005), it is this very troubling of the suitability of the computational *in* cinema that enables us to witness the reproducibility of the computational *as* cinema, and as an ineffable, ephemeral aspect of everyday life. The problem with code and coding in narrative cinema is that it makes for alienated viewing. This happens in two related ways. Firstly, scenes of coding and of computation, of code in action, bring narrative cinema close to avant-garde and experimental cinema insofar as the medium or process is what is at stake in the final edit, rather than genre or plot—hence, genre-switching takes place within the action hacker narrative.[1] Secondly, computational culture works via effacement—it *just is*, *just*

[1] There has been some discussion of whether *Blackhat* constitutes a mainstream-avant-garde film (Tracy 2015). I don't think this is the case. Rather it is importantly a Hollywood hero narrative that makes visible the function of singular hero narratives in obfuscating the complexity of computation beyond the cinema. It is clear that *Blackhat*

does—we only see code when there is a glitch, an error, and then it is witnessed as complexity rather than as the medium; any attempt to narrate code appears as a kind of schism of the narrative genre whereby we are seeing something we shouldn't—the labour of computation.

This chapter is interested in the unnarratability of code in narrative cinema, but also in the ways the abstraction of processes of code is countered by the presence of an action-hero hacker. The action-hero hacker is a manifestation of the sovereignty accorded to the programmer in culture more broadly; a status that is itself a function of the increased abstraction of programming procedures. In other words, this chapter considers a paradox: whilst the representation of software onscreen necessarily appears as a gap or elision—marking what we can't see—this problem of presentation and presentification is also the 'enduring ephemeral' of digital media (Chun 2008a), alerting us to what is at stake in thematising the spectacle and 'control' of digital processes in narrative cinema. This chapter first considers Garrett Stewart's call for a 'narratographic' approach to digital cinema studies, and its limitations in terms of the potential unnarratability of code (defined as Warhol's supranarratable). The middle section of the chapter then turns to *Blackhat* to consider planetary-scale computation as the condition by which digital media are a supranarratable entity. The final section considers *Blackhat* as thematising what Wendy Chun, writing on the ephemerality and sovereignty of software, argues is the ineffability of software, its 'enduring ephemerality'. This chapter asserts that the narrative genre of the action-hero film shares a narrative template with the stories we tell ourselves about software and sovereignty in everyday life.

The Narratability of Hacking and Computation

does experiment with the aesthetic affordances of a digital workflow, as discussed in the second section of this chapter, but this does not mark it as particularly avant-garde.

The kinds of scene this chapter is interested in are those when a film appears to be narrating an instance of computation—in its primary example, *Blackhat*, a hack—but more often represents the limits of what aspects of computation are narratologically and cinematically graspable. The scene is one like this: A man (nearly always a man) sits hunched, precarious, on the edge of a seat, jittery with energy; in front of him is a monitor—a laptop or desktop screen—and a keyboard; he taps rapidly; this guy 'has the world at [his] fingertips'; he will 'enter' forbidden places and 'disrupt' the course of action, breaking down firewalls and planting malicious packages.[2] What do we see when the monitor is revealed? Lines of characters—numbers, symbols, letters—occasionally a word—if, return, help, find, enter; multiple windows; a diagram or two; illegible visualisations of this 'world' at his fingertips. If the camera should move 'through' the screen we get a computer-generated image of computer generation in action—neon, white, blue lines of cables, circuitry, towers and tubes, what Joseph Jeon calls, 'the wire shot'.[3] This familiar scene of hacking occupies the popular imaginary of Anglophone culture. It is the emblem of films and TV shows such as *Tron* (Lisberger 1982); *WarGames* (Badham 1983); *Lawnmower Man* (Leonard 1992); *Hackers* (Softley 1995); *The Matrix* (Wachowski and Wachowski 1999); *Swordfish* (Sena 2001); *24* (2001-2010); *Live Free or Die Hard* (Wiseman 2007); *Transformers* (Bay 2007); *Leverage* (2008-2012), *The Social Network* (Fincher 2010); *The Girl with the Dragon Tattoo* (Fincher 2011); *Person of Interest* (2011-2016); *Skyfall* (Mendes 2012); *The Fifth Estate* (Condon 2013); </*Scorpion*> (2014—); *Avengers: Age of Ultron* (Whedon 2015); *Mr Robot* (2015—). Why is *this* the popularly imagined take on such a significant change in human

[2] A few exceptions/exceptional female hackers: *Hackers* (Softley 1995); *24* (2001—2014); *The Girl with the Dragon Tattoo* (Fincher 2011); *Mr Robot* (2014—); *Furious 7* (Wan 2015).

[3] For a brilliant visual take on generic absurdity of the 'inside' of the computer shot in Hollywood movies see Faith Holland's video 'RIP Geocities' (2011).. Jeon's work on the 'wire shot' is part of a chapter on 'Wire Aesthetics' in *Vicious Circuits: Korea's IMF Cinema and the End of the American Century* (manuscript forthcoming)..

discourse as ubiquitous computation, and how do we critically apprehend what is at stake in this scene?

One way to think of such images is in terms of the postfilmic medium of digital cinema, or the post-cinematic affect of new media visual culture. In *Post-Cinematic Affect* Steven Shaviro argues that digital media 'together with neoliberal economic relations, have given birth to radically new ways of manufacturing and articulating lived experience', a 'contemporary digital and post-cinematic "media ecology"' (Fuller 2005) in which screens, speakers, 'moving images and synthesised sounds, are dispersed pretty much everywhere' (2010: 2, 6-7). Engaging in the expanded visual and affective terrain of new media cinema we can also turn to what might be thought of as a posthuman screen studies (Sobchack 1992, 2004; Bukatman 1993; Darley 2000; Jones 2006; Brown 2009; Cubitt 2015), a loose scholarly field resistant to the screen-ness of the 'digital sublime' (Mosco 2004; Kirschenbaum 2008). In recent work on surveillance cinema Garrett Stewart questions the efficacy of new media cinema scholarship. For Stewart, one of the central problems of 'postfilmic' cinema is its total capitulation to its own medium.[4] Such capitulation is realised through a failure to narrativise; to narratologically render the digital media of everyday life in the fantasy spectacle of mainstream cinema. In *Closed Circuits: Screening Narrative Surveillance Cinema* (2015) Stewart considers the ways in which acts of looking as cinema spectatorship become bound up with the modes of spectatorship that emerge from technological surveillance techniques. Stewart is interested in a set of films that make visible this binding: *M* (Lang 1931); *Rear Window* (Hitchcock 1954); *The Conversation* (Ford Coppola 1974); *Déjà Vu*

[4] For further evidence of the distinction between different approaches the to the theme of digital media in digital cinema, see the special section on *Source Code* (Jones 2011) in *The Oxford Handbook of Sound and Image in Digital Media* (eds. Vernallis, Herzog, Richardson 2013). In that section chapters by Stewart, Sean Cubitt and James Buhler each discuss different ways into thinking the digital-ness of *Source Code* and how it might move us to do new kinds of film studies work.

(Scott 2006); *Source Code* (Jones 2011); and *The Bourne Legacy* (Gilroy 2012). Such films draw attention to 'the shared logistics of editorial cross-cutting and a surveillance hub's channel switching,' and the synecdochic relation whereby the instance of looking represents 'itself both as technological fact and the encompassing social syndrome it pinpoints' (Stewart 2015: x, xiii).

According to Stewart the turn away from theory, textual, and media specific approaches to film studies—in favour of reception, production and other post-theory concerns—is a problem not only because now (with the postfilmic image) we are dealing with significant formal shifts, but also because we have lost the 'cross-disciplinary efforts of a general narratology looking for the rudimentary functions of storytelling' (xix). The result of this loss is that the 'task [of postfilmic analysis] has been instead left mostly to new media studies, which has a tendency to leave narrative cinema far behind for its preferred evidentiary base in experimental video' (xix). I do not agree with Stewart's judgement—visual culture, cultural studies and media studies are vital for alerting us to new contexts of spectatorship, production and consumption alongside histories of film and narrative theory—but his methods offer a useful starting provocation for the work of this chapter.[5] Stewart privileges a method of 'narratography'; a mode of micro-analysis attending to the detail of an image to assess what such details add to the viewer's experience of the film as a narrative of surveillance. Reviewing Stewart's book, Phillip Maciak describes this method as a 'politically inflected formalism' (Maciak 2015: 106). The

[5] The present chapter is part of a larger research project thinking through the relation between popular images of computation and the ways we become user/consumers of digital media in everyday life. As part of that project I am taking into account various contemporary critical theories of cultural transmission: how we learn to, or are conditioned to, get used to new media. Work on affect, gazes, visuality, visibility, narrative, and enchantment as relations between cultural objects and audiences are all of vital importance to thinking through how popular culture imbricates ways of being. Whilst I am aware these approaches are not all necessarily complementary, neither do I believe they are mutually exclusive—as Stewart appears to be suggesting.

narratographic method 'diagnoses the cultural assumptions of screen stories as in part diagnostic of the medium that conditions their production where […] an irony may "present as" filmic or digital effect' (Stewart 2015: 12). Stewart asserts that the only way to articulate how digital cinema that purports to be *about* digital life actually works at making the texture of that life visible, is to witness the digital image as always also telling us something about itself, that is, as always narrating itself as digital media.

This chapter follows Stewart's interest in the narrative intersection of the postfilmic image of/as computational matter, but does so whilst also taking into account what is registered in excess of what is seen. This chapter considers the narrative problem of the ineffable digital-ness of digital media in/as cinema. Computation is narratable in the sense it is a human technology that can be passed on through language and instruction. Computation is also a speculative, imaginary process, not graspable in one discrete image or story. Today, complex ubiquitous computing involving nonhuman cognition, distributed infrastructural networks, and unfathomable numbers of human and nonhuman users constitutes everyday life across the globe (Bratton 2015; Ekman et al. 2016). The vastness and complexity of 'digital media' mean that within the narration of what happens when programmers and nonhuman agents do things with computers are various elisions and gaps of knowledge and understanding. When these processes are represented in the confines of generic narrative cinema the elisions and gaps are made visible. They appear as something unnarratable. In the encapsulation of the digital-control society onscreen we see the totality of the cinematic mode as digital, but we also see the complexity of computation as something ineffable. In the generic scene described above the performance of writing dissolves into abstract computer-generated graphics: the narration of computation is a tautology of the image. As the following section will argue, code in action is not narratable—its nonhuman processes engender a situation whereby the programmer or user is always to some extent writing/using without knowing. When Stewart attends to the 'construction of narrative

space in screen renderings of the robotic camera's ambit and the deciphered ambience of its purview', he is able to do so because the act of looking binds the medium, but the new media, or digital media that comprise the surveillance culture at stake in his work are still not being looked at (Stewart 2015: n.2, 258). To think about the digital medium in and of itself, beyond the apparatus of surveillance, would require reverting the processes of effacement that define mediation (McLuhan [1964] 1997; Bolter and Grusin 1999; Galloway 2012; Kember and Zylinksa 2012).

Attending to the self-effacing context of digital media in narrative cinema is potentially possible, if we follow the logic of Robyn Warhol's exposition of the unnarratable. Working from Gerald Prince's concept of the 'disnarrated', Warhol outlines four aspects, derived from literary realist fiction and then traced into contemporary fi lm, that can be said to comprise the unnarratable: the subnarratable ('needn't be told'); supranarratable ('can't be told'); antinarratable ('shouldn't be told'); paranarratable ('wouldn't be told') (2005: 222). Of interest here is the category of the supranarratable, comprising 'those events that defy narrative, foregrounding the inadequacy of language or of visual image to achieve full representation, even of fictitious events' (223). An example from literary history given by Warhol is the all-black page as the 'antiexpression' of grief in *Tristram Shandy* (223); a 'textual marker in the form of the explicit disclaimer I am calling "unnarration"' (224). With regard film, Warhol suggests that what is supranarratable is that which is too much to be shown: too sexy, too horrible, too violent. For example, in Leo McCary's 1957 *An Affair to Remember*:

> the hero and heroine share a kiss off-screen while the camera frames their bodies up to mid-torso. The kiss itself is left to the viewer's imagination; the aggressively odd framing of the gesture is tantamount to an assertion that the experience cannot be captured in narrative. […] the emotion of the moment transcends representation. (230)

Warhol goes on to suggest that in contemporary film the supranarratable is most often encountered in horror movies, particularly a film like *The Blair Witch Project* (Sánchez and Myrick 1999), where the monstrousness is ineffably present but unseen, unnarrated. In the case of code

and computation we might argue that it is the status of effacement that determines its ineffability. This happens at two levels: firstly, planetary-scale computation dictates that we cannot possibly bear witness to the totality of computation as individuals; the more digital our lives become, the less affordances we have to see the digital. Secondly, computational culture—through its determining logic of software—operates as a mode of effacement whereby the source code as it is input is effaced in the action of computation and then belatedly—when the instruction is successfully completed—returned and reaffirmed as source. In the scene described above the hacker is seen to be master of the world at his fingertips, such is the conceit of computation in the popular imaginary, but this image elides the mediational complexity of the act, of this world.

Warhol's work moves between Victorian novels and contemporary film in the way that Stewart desires—producing a narratographic schema which repeats and re-emerges across time and media. Rather than mobilise Warhol and Stewart's work here to say that what happens when digital media appears on/as screen is *the same as* the supranarratable in *An Affair to Remember*, or a synecdoche for computational culture in general as is 'spectatorship' in Stewart's book, it is leveraged as a means to name the challenge that computation poses to narrative genre. The multiplex critical approaches inspired by the ineffability of digital media in/as cinema force us to encounter the ineffability of coding/hacking as an indelible aspect of the complex machinations of digital media. What we learn from watching, and reading about, digital cinema that thematises digital media is that narrative cinema's depictions and materialisation of digital media are always also a failure to depict and materialise the processes of digital media. In other words, narratives of computation in mainstream cinema offer us proximate, even parallel ways to mark the operations of digital media, and computational culture, *as* elusive.

Blackhat and Planetary-Scale Computation

Michael Mann's 2015 *Blackhat* is an action hacker film that pits the FBI and Chinese military against an international criminal gang believed to be behind high-profile hacks of the Chicago stock exchange and a nuclear power plant in Chai Wan, Hong Kong. *Blackhat* reinscribes prevailing governmental imaginaries—the geopolitical contestations of 'East' and 'West'—even as it narrates the anxiety of new ways of seeing geopolitics, state terrain, and the interdependencies of human users within 'the new emergent order' of planetary-scale computation, or what Benjamin H. Bratton terms 'the Stack' (2015: 11-12).[6] In *Blackhat* the incarcerated American Blackhat hacker Nick Hathaway (Chris Hemsworth) joins the authorities to help them identify another Blackhat hacker. Hathaway is recruited with the offer of his freedom if he can catch the criminals who have reappropriated his old code, a Remote Access Tool (RAT), written for a 'gag' while he was a student at MIT. Hathaway is chosen by the FBI and Chinese Military after his college roommate, Chen Dawai (Wang Leehom), co-author of the RAT and now a captain in the Chinese military, names him as the lead author of the original script. Once Hathaway is released, the team fly to a data centre in an undisclosed location in the US—the origin of the hack that led to the explosion at the nuclear power plant. Lien (Tang Wei), Chen's sister, a network engineer, confirms that the centre has an extremely secure network infrastructure; the breach could not have been made remotely. As we follow Hathaway walking through rows of server cupboards, he adds, 'so someone had to physically enter this room, plug the virus in'. This line describes the mechanism by which *Blackhat* can narrate computation: the origin of this hack requires a body to be present, acting; the apprehension of the hackers later on in the film requires bodies to be presented acting. The narrative is joined by acts of coding and

[6] 'The Stack' describes the unstable situation of planetary-scale computation as we may perceive of it. This is a scenario in which '*Users*, human or nonhuman, are cohered in relation to *Interfaces*, which provide synthetic total images of the *Addressed* landscapes and networks of the whole, from the physical and virtual envelopes of the *City*, to the geographic archipelagos of the *Cloud* and the autophagic consumption of *Earth's* minerals, electrons, and climates that power all of the above' (Bratton 2015, 12).

directives of code but it is moved along in time by human action heroes. In *Blackhat* action sequences are when human heroes fight and bleed and die, and when beads of light traverse graphic renders of circuit boards and cables. The film is an action film that doubles as a walkthrough of the hard and soft infrastructures of the digital control society—from the cooling pumps of nuclear power plants, to law enforcement databases and high-frequency trading, to the 'geeks' who programme this emergent world (Kelty 2005). The relations between human bodies and human stories, on the one hand, and the nonhuman terrain, logic, and agency of the computational, on the other, is a significant aspect of the film which enables a consideration of the way these relations form everyday life more prosaically.

Blackhat begins with a partial view of a white-blue glowing orb—the animated object tilts and pivots; the view zooms in and slowly the glow is revealed as lines of yellow light on dark green-blue planes—the whole electronic earth. The camera follows one yellow line, zooming in, until the final shot in the sequence: a bird's eye view of a power plant at night. Cut to inside the plant, an overhead shot of someone at a control panel noting down number sequences on a pad of paper, against a vista of monitors, lights and buttons. The sound switches from an ambient synth score to voices speaking in a Chinese dialect, and beeps, with some orchestral texture—strings mostly.[7] From the control room the sequence cuts to images inside the plant: a fan and doors around a water tank; a barometer showing the temperature in the green (not red) zone. We are returned to the control room monitors; the shot zooms in on one set of numbers on a screen '35.4', in English and Chinese characters. The numbers become more pixelated, a high-pitched synthetic tinkly glitch accompanies the shot as it goes 'through' the screen. Inside: the camera follows cables to circuit board; are we inside silicon, nano connectors? The movement is ostensibly immersive; the sounds are ambiguous, reminiscent of an electric storm, but the further

[7] The score for *Blackhat* was the work of serval composers, primarily Harry Gregson-Williams, Atticus Ross and Leo Ross. Attribution has been the site of some contention (Yamato 2015).

'in' we get the glitchier they become. There are hundreds of lights pulsing; running up cable. Cut to a bank of switches; a small LED comes on. Then we are out another side: in a different room, a domestic space, a man is typing into a keyboard. We see him from the opposite side of the room—are we looking out from a power socket? His face is obscured by a desktop monitor. We cut to a desktop view and can make out his hands; we see his ashtray full of cigarette butts. Cut to a view of the keyboard; he is bashing at keys. He hits enter. Cut to overhead shot; the man puts the keyboard down on the desk. Then the movement reverses as we go back 'inside' the programme; we go back the way we came—past the switches, along the cables—but the sequence is now intercut with the monitors in the control room at the plant; they display a barometer getting too hot. Eventually the fan breaks, pipes start turning red, the water in the cooling tank starts boiling; it erupts; an explosion. Cut to outside the plant where people in high visibility jackets and hard hats are running around.

An anonymous reviewer on the site news-entertainment.net writes of this sequence, 'Boo hoo for making these dumb animations of what the inside of a computer doesn't look like'. The animation sequence is long (two minutes forty seconds), and interesting to a point, but it is also alienating: it is unclear what is being narrated, if anything. Despite the technological 'look' of the animated 'inside' sequence, the effect is that of the supranarratable, whereby what is seen onscreen is an 'aggressively odd framing', 'tantamount to an assertion that the experience cannot be captured in narrative' (Warhol 2005: 230). The audience is moved through an odd surround with little to anchor a sense of what things are, or why things are there. The lights that we follow through the machine ostensibly move between an undisclosed location where the hacker resides—later revealed as Jakarta—and the nuclear power plant in Hong Kong, and yet we see no underwater cables, no network infrastructure. The critic who boo-hoo-ed the animation sequence underestimates what this sequence stands in for; taking into account the scale of what

is being referenced only adds to the sense that the animation is failing to narrate what is happening.

The animation sequence described above imagines the complex, stacked, terrain of computation as a kind of governance. In this sequence what is theoretically being narrated is what will later turn out to be the first in a series of hacks designed to extract a huge amount of capital from global markets: the hack on the nuclear reactor and Chicago Stock Exchange generate cash which will be invested in trading tin futures; the second part of the hack consists of flooding multiple tin mines in Malaysia, instigating a global crisis in tin supply; at the onset of crisis the hacker will stand to make a huge amount of personal wealth by selling the investment made after the first hack. The paranoid fantasy in this story is that 'one man' can make such a thing happen (discussed in more detail in the following section). At stake in this sequence is the possibility of narrativising the infrastructural complexity that makes the plot possible. Rather than the 'inside' of the computer, the animation attempts to chart a course through an emergent 'geospace', in which regimes (some State-based, some non-State-based) 'extract value from new flows, namely data' that evolve as a mode of 'governmentality' in relation to the new vistas generated by planetary-scale computation (Bratton, Pepi, Jordan n.d).

Whilst the threat of remote access sabotage manifest in malware is real, the image of this technique is an elision; shorthand for what cannot be manifest in narrative cinema. The animation sequence demands a distinction between what is narratable and what is expressed.[8] The nonsense image attests precisely to the unnarratability of computation (in the logic of

[8] In interviews Mann has verified that the animated sequence is intended to be 'authentic': 'The sequence goes inside the computer and uses the actual shape of a transistor: one piece of conductive metal that has a surplus of electrons, and one with no electrons. The one license we took is we made them be two different colors' (Mann and Watercutter 2015). In a viewing of the film, this taxonomic aspect is missing, cut out from the frame; instead the presumption that the audience be moved through the computational derails narrative sense.

Warhol's analysis of the supranarratable), but the nonsense image is itself an expression of the ineffability of computation. Holding onto the narratographic detail of the scene does not grant an insight into the detail of digital media unless we can understand the limits of representation as cinematic detail. The medium transmits this tautology through the aesthetic. As several posts online about the film have observed, *Blackhat* is visually noisy. Using many of the same cameras and a similar digital work flow to David Fincher's recent films, all considered 'hyper-real' (Dargis 2010; Kushigemachi 2011), *Blackhat* nonetheless ends up privileging the potential 'video-ness of digital video' (Gores 2015), an 'ambient fuzz' (Tracy 2015) of 'thin-looking, at times near-translucent visuals' (Dargis 2015).[9] This is another way of saying that in Mann's *Blackhat* the digital workflow is made to function paradoxically as a resistance against verisimilitude. We are watching the composition of a digital narrative—different cameras, aspect ratios, resolutions, all compressed into a single file. In this way, what appears as noise and messy complexity in Mann's film is in fact another marker of the ineffability of digital media; a 'textual marker in the form of the explicit disclaimer […] "unnarration"' (Warhol 2005: 223). Whether it be the complexity of a planetary-scale stack, or the effacing logic of software (as will be discussed in the next section) the opening sequence of *Blackhat* produces digital media as a supranarratable condition. The effect of the digital medium can then be thought of affectively as an exercise in seeing what cinema supresses: the non-indexicality of digital mediation. In other words, in a sequence that narrates nothing about digital media, but nonetheless expresses digital media, we watch mediational processes usually effaced, and scales of operation beyond our comprehension.

[9] It is worth noting the movies that hackers deem to be 'authentic' portrayals of their work and lifestyle (in the US); Fincher's *The Social Network* is one of the few that beats *Blackhat*. I have written on the representation of code in *The Social Network* at length (Dinnen 2013), and on the banality of computation across Fincher's works in my forthcoming monograph, *The Digital Banal* (Columbia University Press, 2018).

Black Boxes and Black Hats as Empowering Obfuscations[10]

Blackhat was far from a box office success; it flopped on release and was pulled out of most US theatres by week three (Friedman 2015). This failure at the box office was surprising: the production 'paired an esteemed filmmaker with a fast-rising star, and fused them to a hot-button issue that couldn't be more timely' (D'Alessandro 2015). The film was deemed 'worthy' (D'Alessandro 2015), 'solemn, grandiose' (Zoller Seitz 2015), and 'a spectacular work of unhinged movie making' (Dargis 2015), but also 'ludicrous' (Zoller Seitz 2015), 'ridiculous' (Bradshaw 2015) and 'lumbering' (Orr 2015). Various reasons have been given as to why *Blackhat* failed so badly in cinemas—in particular that its marketing campaign and trailer failed to 'sell' the story—but crucial to its failure is probably precisely what is so 'timely' about the film in the first place—'hacking as a sales tool is nerdy and unappealing' (D'Alessandro 2015). In interviews Mann has suggested the film is about Hathaway and his journey through the situation he finds himself in. When asked about the biggest challenge to producing the film, Mann replied, 'getting a basic understanding of computers and then being able to jump on a terminal which Chris [Hemsworth] did, with a lot of help from a lot of our friends […] using his skills as a hacker to become the engine of the storytelling […] in other words [hacking] is not just a veneer on a thriller' (Mann and Galloway 2014).[11] Key to thinking about computation with *Blackhat* is recognising that computation is a 'deeply physical event' (Bratton 2015: 12). Through the relation between the human hacker actors, the geographical and physical surrounds, and the imaging of computation, *Blackhat* is able to gesture toward emergent sovereignties. It does this

[10] The phrase 'empowering obfuscations' is taken from Chun (2011a, 59).

[11] One community who responded well to *Blackhat* was hackers (Clark Estes 2015; Metz 2015; Zurcher 2015). The attention paid to the procedures of code and cybersecurity were broadly considered to be authentic.

through the deterritorializing image of 'computation' as described above, and through its narrative attention to code as a material substrate of new geopolitical conditions.

Unlike reading and writing in human-to-human communication, human-to-computer communication—as programming or hacking—is enacted through what will have been executable language (Galloway 2004: 2012). Programming a computer involves inputting a string of characters which will execute action. This does not happen magically all at once, but by layers of code each 'conversing' with the next layer until a discrete switch is moved in a circuit. Human programmers usually work in high-level (abstract) programming languages which are syntactically similar to natural languages; these are then compiled as 'object code' (a machine-readable language, or low-level programming language). The source code—the code written by the programmer—is only source after the fact, after the code has been compiled and executed (Chun 2008a, 2008b, 2011a). Source code disappears and becomes object code; we can only retrospectively locate it as the higher-level code, the 'source' of action. This is what Wendy Chun terms the 'enduring ephemeral' of software (Chun 2008a). Despite the assumption that programming produces the future, its status as source code after the fact means it can only exist in the present. In programming, the present stands in for the future: 'to program a computer is to produce a series of stored instructions that supposedly guarantee—and often stand in for—a certain action' (Chun 2008a). The capacity for digital technologies to store the past—in the form of data—is what produces the capabilities for computational programming of the future; this proliferates through culture as the assumption that digital media is an ever-expanding memory. Rejecting this assumption Chun's articulation of new media as 'enduring ephemeral' unpicks the conceit of endless memory, the archival qualities of digital media. Instead it directs attention to the performative situation that enables code to be thought of as executable, and that emerges out of the executability of code. Code 'automatically brings together disciplinary and sovereign power through the production of self-enforcing rules that […] 'govern' a situation' (2011a: 27).

Accounting for and attending to a desire for sovereign power is important for thinking about the way computational culture troubles narrative. Code appears as a set of narratological clauses: if this happens, then that happens; find this term in this set, then return this object to this site. The mechanism of these processes is more stubbornly complex in that it involves acts that are not actionable by humans, or by human language. As Wendy Chun argues, software 'is ephemeral, information ghostly,' and 'code is 'an abstraction that is haunted, a source that is a re-source, a source that renders the machinic—with its annoying specificities or "bugs"—ghostly' (2011a: 21, 50). Key to understanding the processes of code is accepting the complex agency of its action. In popular culture, representations of digital media tend to coalesce around generic abstract images of 'inside' machines, and generic scenes of hackers and programmers inputting code. The generic hacker scene described earlier in this chapter, and the specific hack sequence of *Blackhat*, reproduce the problem of the sensible that defines the computational beyond cinema: a 'linking of rationality with mysticism, knowability with what is unknown' makes the computer 'a powerful fetish that offers its programmers and users alike a sense of empowerment, of sovereign subjectivity, that covers over—barely—a sense of profound ignorance' (Chun 2011a: 18). The animation at the beginning of *Blackhat* is an attempt to close the gap between software and hardware that marks contemporary computational culture. Today most kinds of programming rely on an explosion of abstraction which produces 'automatic programming'; securing and hiding the operations of the computer from the 'intellectual' work of programming, and recruiting the computer into its own operation (Chun 2011a: 34-46). Abstraction bestows power on the programmer who can intervene and master the machine in a creative way, but it also reinforces programmers' and users' ignorance as the operations of the machine are further blackboxed. *Blackhat* exemplifies the way that over the history of software development, programming has become increasingly more abstract, according the programmer a powerful role and expanding the terrain of the nonhuman—that is, expanding the ways in which code writes code.

In *Blackhat*, after the team lose the trail of the hacker in the US, they 'follow the money' to Hong Kong. There they set up a control room in an apartment where they monitor several bank accounts which may lead them to some of the people involved in the hack, and eventually *the* hacker. In Hong Kong they join forces with local police in order to trace three men who they believe are acting on behalf of the lead hacker. The law enforcement representatives plus Hathaway and Lien all sit around in front of computer screens: monitoring bank accounts; looking at the RAT code; looking at satellite maps with marks of the three henchmen's daily movements. Given that this is a film about hacking it seems odd that so many people are required to be physically in situ for the crime to be solved. It seems odd, but it is an exposition of the programmer/programming fetish of contemporary computational culture. As with other action hacker films, we find that there is only one hacker for the job.[12] Both Blackhat hackers in the film—Hathaway and the criminal Blackhat hacker, Sadak (Yorick van Wageningen)—are the only men that can do their job. The narrative premise of the film is that Hathaway has to be furloughed out of prison in order to interpret a hack that the FBI and the Chinese government are already working on. The film's climax is a one-on-one, man-to-man showdown where one Blackhat hacker must kill another in order to survive (Hathaway 'wins'). The 'erasure of execution through source code as source creates an intentional authorial subject: the computer, the program, or the user, and this source is treated as the source of meaning' (Chun 2011a: 53). Such logic informs the structure of *Blackhat*: the code that cannot be cracked contains within it the authorial signature of the original programmer; only he can uncover the identity of the secondary author. In this sense the body of the programmer as action hero has to move the

[12] This is a particularly common trope in popular depictions of hacking—see all the films mentioned throughout this chapter. Perhaps more surprisingly it also marks many documentary depictions of hacking in mainstream culture. For example, *The Internet's Own Boy* (Knappenberger 2014), *Citizenfour* (Poitras 2014), *We Steal Secrets: The Story of Wikileaks* (Gibney 2013)

narrative on in time. Despite the computational labour we witness as animation the narrative is driven by human bodies connecting and interpreting computational events.

In Hong Kong the apartment functions as the control room. We might also watch all the scenes in Hong Kong as an extension of the computational matter imagined in the opening animation sequence; an effect of how the control room is an event of the narrative. The team watch the three suspects go past the same point every day – a public garden square. The Hong Kong police detective, Alex Trang (Andy On), takes them to the square and reveals there is already a police surveillance team set up in a van monitoring Elias Kassar (Ritchie Coster), a former Lebanese paramilitary who also goes to the square every day. The van is a second control room. The two investigations are actually the same: after Hathaway walks around the square with a signal tracker he discovers a short-range Bluetooth transmitter hidden in the bushes; it has been used to transmit messages between Kassar and the three runners. Important to note is that Hathaway's knowledge of computational infrastructure enables the film to map a hack beyond the source-scene of a personal computer. Hathaway knows that sometimes a hack requires communication away from the Internet. The physical walk through echoes the speculative 'walkthrough' of the hack which opens the film. As the team physically move about and intercept criminal activity, all the while leading the viewer through the night markets and gardens of the urban centre of Hong Kong, the colours and geometries on display mark the scenes as still on-grid. From the boxy apartment and rectangular computer monitors, to the garden square that the team visit; from the shot of the market by the apartment as a long, narrow grid of light, to the inside of the surveillance van; the images are coloured in the red and green and white neon hues of the opening animation.

Blackhat is organised by colour. Each location was to have a different colour scheme; a structure enabled by the digital workflow of the production. The intention was for 'the audience to recognize what country they were in using a specific color palette for the architecture and light

sources' (Rogers 2015). Hong Kong is the first location outside the US to be shown in the film. Its colour scheme is closest to the machine. Such continuation affectively suppresses stark distinctions between the different kinds of labouring taking place—programming, hacking, computation, police work, detection. *Blackhat* holds the tension of the opening sequence throughout the film: the humans that appear as masters of code are always coming up against code as its own kind of sourcery. Once the team have discovered the Bluetooth transmitter they attempt to read the messages it has been sending. These are of course encoded; Hathaway and Chen cannot crack the 512-bit encryption key; it would take Hathaway 'about a month' to own it. Here the computation resists being 'known' and instead the team have to 'sit on' Kassar, physically watch to see what he does. The film renders the physical action requisite to its status as thriller through the speculative image of the computational, while paradoxically calling out the ineffability of that computational which resists interpolation and apprehension.

Conclusion

In *Blackhat* the sovereignty of the Blackhat hackers appears as the fantasy of individual human sovereignty—a mode of governance that planetary-scale computation and the global sweep of neoliberalism utterly undermines. This chapter has considered the limits of representing vast and nano scales of computation in mainstream cinema. In the case of what is supranarratable in *Blackhat*, we are able to witness the ways generic narrative cinema alerts us to what we cannot explain in general. The figure of the action-hacker hero has long been coming. Chun argues, '[…] source code supposedly enable[s] an understanding and a freedom—the ability to map and know the workings of the machine, but again, only through a magical erasure of the gap between source and execution, an erasure of execution itself' (Chun 2011a: 51). Given this situation it is not surprising we have a cultural fetish for the wizards and masters of computation, for the magical erasure that roots our vastly complex experiences of mediation.

The supranarratable nature of computation is by no means a negation of knowledge by narrative. Rather 'the ways in which we cannot know software can be an enabling condition' a way to acknowledge the future as something we cannot always prepare for (Chun 2011a: 54). And, even in the perceptually closed textual object of a film we may find such open-ness to future knowledge. About half way through *Blackhat* the team go to visit the nuclear plant to see if they can salvage any data that could help them trace the hacker. The scene at the plant when they arrive is almost exactly as it was when we—the audience—left: it is as if the explosion has just taken place. This doesn't make too much sense in the timeline of the film, given that we have been following Hathaway and the others for at least a week in L.A., California. In February 2016 Mann announced he was working on a new Director's cut of *Blackhat*. In the new cut the hack on the Chicago Stock Exchange opens the film; the Hong Kong nuclear explosion takes place later, and the team arrive in Hong Kong as soon as the explosion happens. The film was shot and plotted with the revised cut as the original cut and only later in the post-production process was it reordered to open with the Hong Kong hack (Adams 2016). Whilst 'director's cuts' predate digital cinema (Lambie 2012), the digital media conditions of contemporary cinema are such that even the original cut is a version—there is no singular filmic object. In mainstream films that thematise digital media we can witness some of the complex intersections of computation in/as cinema. The ungrasp-ability of all that computation is significantly, paradoxically rendered as a digital cinema that is itself an ineffable, ungraspable, enduringly ephemeral medium.

Filmography

24, television series. USA: Imagine Television et al., 2001—2014.
</Scorpion>, television series. USA: K/O Paper Products, et al., 2014—.
Avengers: Age of Ultron, film, directed by Joss Whedon. USA: Marvel Studios, 2015.
Blackhat, film, directed by Michael Mann. USA: Legendary Entertainment, 2015.
Citizenfour, film, directed by Laura Poitras. USA: HBO Films, 2014.
Furious 7, film, directed by James Wan. USA: Original Film et al., 2015.

Hackers, film, directed by Iain Softley. USA: United Artists, 1995.
Leverage, television series. USA: TNT et al., 2008—2012.
Live Free or Die Hard, film, directed by Len Wiseman. USA: Cheyenne Enterprises, et al., 2007.
Mr Robot, television series. USA: Universal Cable Productions/Anonymous Content, 2014—.
Person of Interest, television series. USA: Bad Robot Productions, et al., 2011-2016.
Skyfall, film, directed by Sam Mendes. UK: Eon Productions, 2012.
Source Code, film, directed by Duncan Jones. USA: The Mark Gordon Company, 2011.
Swordfish, film, directed by Dominic Sena. USA: Village Roadshow Pictures, 2001.
Person of Interest, television series. USA: Bad Robot Productions, et al., 2011-2016.
The Girl with the Dragon Tattoo, film, directed by David Fincher. USA: Scott Rudin Productions, 2011.
The Internet's Own Boy, film, directed by Brian Knappenberger. USA: Luminant Media, 2014.
The Lawnmower Man, film, directed by Brett Leonard. USA: Allied Vision, 1992.
The Matrix, film, directed by Wachowski and Wachowski. Australia/USA: Village Roadshow Pictures, 1999.
The Social Network, film, directed by David Fincher. USA: Relativity Media, et al., 2010.
Transformers, film, directed by Michael Bay. USA: di Bonaventura Pictures/Hasbro, 2007.
Tron, film, directed by Steven Lisberger. USA: Walt Disney Productions, 1982.
WarGames, film, directed by John Badham. USA: United Artists, 1983.
We Steal Secrets: The Story of Wikileaks, film directed by Alex Gibney 2013. USA: Jigsaw Productions, 2013.

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