This somewhat prismatic framing of the past, present and future of the cinematic suggests vectors of analysis and contemplation that weave through the rest of this book, even as we lunch far beyond time based media and back again. The paths of exploration begun by the artists in the chapter hint at the shape of the ever-widening spiral we will traverse, but they also provide a centre of gravity and a reminder of what is to be lost and gained. It is neither the breathless hyperbole of the 'new' that drives us, nor nostalgia for a probably imaginary past, but a vision of the cinematic form whose roots tangle together the past, present and future of media, art and practice.

Chapter 2
New Practices / New Paradigms

G\lding through the woods, trees diaphanous and white, the forest apparitional and didactic rather than solid and sturdy, more intimation than image: here in a disembodied traversal we witness the alluring power of an aesthetic of detection and tracing. It is an aesthetic of delineation and layering, of light sent and returned, measured and analysed. It is an aesthetic that, in its often wispy sparsity, belies its growing precision and accuracy. And it is an aesthetic that profoundly underscores the movement from the regime of representation to that of information, and in this moment, as the technology gradually improves, we witness the glitchy in-between stage that produces a surprisingly appealing form of imagery. We might imagine these images to constitute a momentary visual trend, captivating in their ephemeral nature, but they might also speak to nostalgia for the present, a present understood to be at once oriented toward the project of unrelenting surveillance looming on our near horizon and the as-yet unrealised totality of control. There is pleasure in the gesture and its failure, there is beauty in the founding endeavour. At least for now.

The moving image sequence I reference here is drawn from the work of ScanLAB Projects, a London-based creative studio whose work employs techniques of 3D scanning for an array of projects, from architectural scans to those that capture swatches of the Earth for environmental purposes. The images are captured through the use of Lidar, which stands for 'light detection and radar' and refers to a process of remote sensing using a laser to brighten an area, which is then measured and analysed.

Lidar is just one of many technologies that are transforming what we understand to be the cinematic image. These shifts reverberate well beyond image capture to include a series of compelling and dramatic alterations in many of the most fundamental aspects of the film industry and its forms, most of which have remained relatively stable for nearly a century. The standard gauge for professional filmmaking was 35mm, established by Thomas Edison and the Lumière Brothers at the birth of cinema. The
frame rate, too, set to 24 frames per second, was determined in the 1920s both to accommodate sound and to create a seamless illusion of motion. The steps in the filmmaking process were quickly codified and aligned with the assembly line, the better to support a burgeoning commercial industry that would require repetition and shared resources to increase profits.

Disruptions of the basic cinematic workflow occur at regular intervals, but the advent of digital filmmaking in the late 1990s marked a dramatic shift. The cameras, process of capture, editing techniques, visual effects, distribution strategies and exhibition options have all changed. These developments have in turn offered filmmakers new creative possibilities. For example, in the simplest terms, the low cost of videotape in comparison with film stock meant that filmmakers and their cast members could rethink performance expectations. Similarly, the ever-increasing storage capacity of both cameras and the drives used in the filmmaking process were exploited for experiments with temporality. Alexander Sokurov's Russian Ark (2002), for example, was created from a single, ninety-minute shot captured directly to a hard-drive. These shifts - small and large - are myriad, and they invite a widespread rethinking of the basic vocabularies of 'film' and 'cinema', 'live-action' and even 'animation'. As Stephen Prince points out in Digital Visual Effects in Film (2012), 'Cinema, according to a predominant model, is a photographic medium oriented toward live-action in which filmmakers arrange performers and events before the camera during production, with the camera used as a recording mechanism to capture an accurate facsimile of what has been placed before it' (2012: 2). He continues, presenting a reorientation that has yet to fully inform film culture, despite the changes happening all around us:

[Models of cinema - those that attribute the medium’s properties to a base in photography - provide an insufficient account of the ways that cinema operates in a narrative mode and as a medium amalgamating different image types and categories. (Ibid.)

Not only do we need to re-conceive and re-name aspects of the process, but we need to understand shifts in the basic filmmaking workflow, with workflow here defined as the steps in a process designed to capture, store, manage, manipulate and output the material necessary for a movie. David Stump offers another definition of workflow: ‘I define workflow as the process whereby images, audio and metadata are recorded, backed up, distributed and safeguarded’ (2014: np) adding that ‘there are infinite combinations of hardware and software that can be used for these purposes’ (Ibid.). It is in the infinity of combinations that we find both an opportunity for creativity and cause for headache. Scott Arundale and Tashi Trieu underscore the significance of defining each project’s unique workflow:

With the explosion in the number of cameras, codecs, software and hardware platforms, it is abundantly clear that no two workflows are identical. Therefore, the filmmaker/producer/supervisor must define a workflow going forward and remain flexible enough to be able to adapt and change it where necessary due to innovations and technological advances, or alternately to avoid bottlenecks should they arise. (2014: 23-4)

These workflows are not yet fixed; instead they are fashioned anew for each project. The shift to digital capture has opened up a bewildering array of options in each of the parts of the process such that even the ability to design an appropriate workflow has itself become a much-needed skill.

These emerging workflows also introduce entirely new steps into the filmmaking process, as well as the need for new crew members. For example, film sets are now home to Data Wranglers (or loaders) responsible for making copies and back-ups of the data captured by the camera, while Digital Imaging Technicians (DITs) work closely with the cinematographer to achieve the look desired for the project. As Arundale and Trieu explain, the Digital Imaging Technician ‘is responsible for making sure the signal from the camera and previously recorded data goes through the proper chain of conversions, look-up tables (LUTs), and colour correction processes’ (2014: 80), while also serving as a liaison with camera manufacturers, rental houses and post-production facilities. While in previous decades, the various departments involved in major production, including camera, editorial and sound, worked relatively autonomously, digital workflows blur these boundaries, and the DIT is often the figure who moves across these disparate departments to ensure an efficient and consistent workflow for all involved.

The Data Wranglers and DITs are just two in an increasingly long list of new terms and practices that characterise digital filmmaking at this moment. However, there are larger conceptual shifts as well. In this chapter, I examine several of these shifts and techniques in order to consider how they resonate with changes in emerging cultural practices, the posthuman and the post-cinematic. Rather than offering an exhaustive survey, I hope instead to consider the significance of selected practices that suggest alterations in how we understand the cinematic in the twenty-first century.

**Previsualization**

Throughout most of the history of cinema, filmmakers have planned the visual design of their projects beforehand, through elaborate sketches, photographs, storyboards and even animated sequences, known as animatics, rip-o-matics or story reels. However, as special effects have gained prominence, the need to plan for and test these sequences before production begins has similarly increased, and filmmakers are increasingly developing more elaborate strategies to prepare for production. Previsualization has emerged as one such strategy, and is just one of many new terms to enter pre- and post-production workflows. Others include pitchwire (a visualization used to pitch a project before it has been made); techwire (a visualization designed to depict information related to the camera, lighting and design for a film to help understand the technical resources
required for a production); and postviz (a visualisation that combines effects shots and production photography to indicate options for a finished film). Previsualization is defined by the Joint Technology Subcommittee on Previsualization, a collaboration between the Visual Effects Society (VES), the Art Director’s Guild (ADG) and the American Society of Cinematographers (ASC), as ‘a collaborative process that generates preliminary versions of shots or sequences, predominantly using 3D animation tools and a virtual environment. It enables filmmakers to visually explore creative ideas, plan technical solutions and communicate a shared vision for efficient production’ (Okan and Zerman 2015: 46). This definition is also used by the Previsualization Society, founded by and dedicated to those who are engaged in previsualization.

Previsualization is becoming increasingly popular and complex – the previsualization planning for Brad Bird’s Tomorrowland (2015), for example, lasted a year (see Martin 2015: np) – and companies dedicated specifically to handling this phase of production have emerged. Hair, founded in 2003 by Daniel Gregoire, is a leading previsualization company based in Santa Monica, California, and known for its work on dozens of major films and commercials. The Third Floor, a Los Angeles-based firm founded in 2004 by Chris Edwards, is another major force in previsualization. Gregoire and Edwards are both founding members of the non-profit Previsualization Society, dedicated to promoting previsualization as an art form.

When describing the techniques of previsualization, Chris Edwards likens the process to the development of early storyboard art by Alfred Hitchcock, who used extensive drawings to help direct action-filled sequences in films such as Psycho (1960) and The Birds (1963). The practice evolved so that filmmakers such as George Lucas might create animatics, or test sequences of Jedi flights using Barbie and GI Joe dolls, just to get the feel for a sequence visually. On early films, Lucas also had used rip-nomatics, which borrow video clips from other movies to illustrate the overall gist of a sequence. While the practice in the past was generally restricted to action sequences, according to Edwards, the process is increasingly part of many movies.

The previs process includes creating 3D assets, blocking basic camera moves and capturing possible shots. According to Mike Fink, a USC faculty member and visual effects specialist, previs is most important in helping demonstrate potential problems with difficult shot set-ups or riggings in challenging locations:

On Clockstoppers, we used previs to determine motion control moves well before we got to the location. This was very important on that show because the motion control had to fit in some very tiny spaces. We modelled the rig, and placed it on the virtual set so that we knew beforehand that everything would fit’ (2003: np).

Edwards dubs all of this ‘shot design’, and says that the tools that facilitate shot design enable more effective collaboration: ‘Animators, filmmakers and game developers are all using the same digital tools and this leads to increased collaboration and efficient transmedia production’ (2012: np). He says his team of artists must be very versatile in the use of new and emerging tools and yet also skilled in classical filmmaking: ‘They’re directors-in-training; they’re editors-in-training; they’re cinematographers-in-training; and they understand modelling and textures’ (ibid.).

The material generated in the previs process ends up becoming ‘an animated blueprint or design document’ (ibid.), Edward continues. What is so significant, however, is that this material begins to establish not only the visual look and feel of a film as it is derived from the concept art, but it also begins to craft the actual shots, the cutting and even the audio. Parts of the film, then, are made before production actually begins. As Fink explains, the use of previs can disrupt some of the traditional workflow expectations:

The director of photography is the person on a film who has the responsibility to set shots and help the director decide on lens, camera and lighting choices in his attempt to tell a story. […] But I often have script previsualized months before the DP is hired. The DP, and any others involved in helping the director tell the story, must be brought into the previs process as early as possible so that there are no surprises, and no bruised egos, along the way. (2003: np)

Previs is also in many cases supplanting the traditional storyboard as the technique for planning and mapping a live-action feature film, and is definitely the tool adopted for any kind of special effect.

In essence, with the increased significance of previs, the entire workflow of traditional filmmaking gets turned inside out, the linear sequence is reimagined, and many of the decisions we assume to be the province of the director and/or cinematographer are made by shot designers. While this shift is not in itself constitutive of the post-cinematic, it points to the rearrangements within the linear tradition, while also suggesting the growing prominence of computer-based design in the filmmaking process.

**Transmedia Story Design**

If previs is disrupting the linearity of the traditional filmmaking workflow, a relatively new concept – transmedia design – disturbs traditional notions of the film and its ancillary products. Transmedia design prescribes a design process that, instead of viewing the film as the centre and everything else as peripheral, imagines a unified multi-platform design method attending to the numerous directions of a story as it travels across diverse media forms. While still gaining traction as a widespread industrial practice, transmedia design has a long history and plausibly compelling future.

In Playing With Power in Movies, Television and Video Games: From Muppet Babies to Teenage Mutant Ninja Turtles (1991), Marsha Kinder coined the term 'transmedia' to reference a form of intertextuality that characterised television shows and games as they borrowed from, referenced, and, in various ways, acknowledged existing movies. Kinder’s understanding of intertextuality is based on Julia Kristeva’s use of the term,
which argues that every text participates in a larger signifying system. Kristeva writes that texts are ‘mosaics of quotations; any text is the absorption and transformation of another’ (1980: 66). Texts are systems that rely on and are constituted by other systems. Kinder builds on this idea to explore the ways in which entertainment entities constitute precisely this ‘mosaic of quotations’: ‘Thus, even before children go to the cinema, they learn that movies make a vital contribution to an ever-expanding super-system of entertainment, one marked by transmedia intertextuality (1991: 1; emphasis in original). Kinder continued to use the term ‘transmedia intertextuality’ throughout her book to name the dialogic connectivity among the varying components of a broad entertainment system, and it is this understanding of the term that inspired further development by Henry Jenkins, who has offered the most elaborate and extensive expansion of the term to date. His use deviates from that of Kinder, however, in that he is specifically referencing a growing trend within both the entertainment industry and among independent media makers to find ways to craft stories across diverse platforms in part in order to take advantage of the proliferation of networked screens all around us. He defines transmedia storytelling in this way:

Transmedia storytelling represents a process where integral elements of a fiction get dispersed systematically across multiple delivery channels for the purpose of creating a unified and coordinated entertainment experience. Ideally, each medium makes its own unique contribution to the unfolding of the story. So, for example, in The Matrix franchise, key bits of information are conveyed through three live-action films, a series of animated shorts, two collections of comic book stories, and several video games. There is no one single source or ur-text where one can turn to gain all of the information needed to comprehend the Matrix universe. (2007: np)

As transmedia storytelling has gained traction, Jenkins has continued to refine the definition, expanding it even further in order to accommodate a spectrum of creative and commercial practices. Writing four years after posting his initial definition, Jenkins reflects the diffusion of the term across multiple uses of media:

Transmedia storytelling describes one logic for thinking about the flow of content across media. We might also think about transmedia branding, transmedia performance, transmedia ritual, transmedia play, transmedia activism, and transmedia spectacle, as other logics. (2011: np; emphasis in original)

Here, Jenkins acknowledges the spread of the term, and the ways in which other practices, from branding to activism, might mobilise across disparate media platforms. With regard to storytelling, however, what is most striking about transmedia is how it can deepen a story experience, expanding it across multiple reception contexts and allowing for increased audience participation. In so doing, however, the story also calls attention to the structures and linkages underlying its diverse media platforms. In other words, where we once looked to cinema viewership as the definitive experience of immersion, understood to be the sensation of being fully absorbed within a story world presented in a dark theatre on a massive screen, the defining characteristic of transmedia immersion may include the ability to stitch together narrative elements from a diverse range of sources and viewing experiences. Here, immersion is realised through various forms of engaged but dispersed experience, including the often intensive, collaborative problem-solving that invites teams of strangers to work together to solve puzzles and unlock layers of a story, as in the widely celebrated alternate reality game, I Love Bees (2004). In addition to inviting players into a hybrid, science-fictional story world of alien invasion, I Love Bees provided narrative backstory that anticipated Bungie’s release of the video game Halo 3 (2004), thereby blurring the boundary between advertising and entertainment.

Transmedia immersion may also include the ability to drill down into particular aspects of a story by moving from an online fictional series, to web-based interview material, to real-world resources, as in East Los High (2013), an online dramatic series in its fourth season on Hulu at the time of writing. The show has been heralded for its inventive use of transmedia design to connect the realms of fiction and nonfiction in order to help its teen audience ask questions about sexuality and solve real world personal problems. Rather than a monolithic understanding of immersion, then, we begin to acknowledge a spectrum of engaged experience that is not predicated on that of the movie theatre. Immersion now may imply engagement, participation, collaboration and contribution, acts that seamlessly traverse the real and fictional worlds.

Frank Rose explores the concept of immersion directly in The Art of Immersion: How the Digital Generation Is Remaking Hollywood, Madison Avenue, and the Way We Tell Stories (2012). According to Rose, an audience that is now characterised by its ability to multi-task and to juggle disparate digital tasks while also connecting with friends and family via Facebook, Instagram and text messaging seeks not coherent, linear stories but total immersion in hyperconnected worlds. Our sense of mediated interconnectivity sparks the need for new story forms, as Rose explains: ‘a new type of narrative is emerging – one that’s told through many media at once in a way that’s nonlinear, that’s participatory and often gamelike, and that’s designed above all to be immersive’ (2012: 3). Rose uses the term ‘deep media’ to characterise these manifold story worlds. Once again, however, this sense of immersion shifts from being a sensory experience that we know from cinema to one that engages participants in the act of parsing, connecting, investigating and piecing together.

Jay Bushman, the transmedia producer and a writer for The Lizzie Bennet Diaries, helps continue to delineate the definition of transmedia by distinguishing between franchise transmedia and integrated transmedia. Franchise transmedia creates a system in which there are movies, books, video games and comics that all function together to form a seamless story. The Marvel movie universe, for example, studiously avoids contradiction and the Marvel properties all work together to maintain a coherent story world. In contrast, integrated transmedia uses a single story that spreads across
multiple media forms. In the franchise or multimedia realm, each piece can stand alone; you do not need to have experienced one element to understand another element. With integrated transmedia projects, the pieces are not stand-alone; they are fragments of the larger story world. The logic of franchise transmedia tends to follow the logic of large-scale entertainment entities, while integrated transmedia tends to be smaller and more flexible.

Christy Dena adds even more to a delineation of transmedia story design by outlining four different approaches to the design of a transmedia project. The first approach designates projects in which disparate story elements across different media platforms contribute distinct story elements to the larger project; in the second, the disparate media elements contribute to the telling of a single story; a third paradigm is one in which storytellers decide to expand on an existing story, building it out across different media platforms; and the fourth constitutes those projects that are designed to be transmedia from the beginning. In contrast, Colin B. Harvey, in 'A Taxonomy of Transmedia Storytelling' (2014), uses legal relationships as the basis for parsing transmedia, focusing on intellectual property; this approach allows him to acknowledge the complexity of user participation, both official and unofficial.

As transmedia gains traction, differing creative groups adopt the form. Writing a series of short essays in 2011 on Aca-Fan, Jenkins' blog, Brian Clark outlined three specific transmedia creator communities: i) those who are creating extensions of existing media properties; ii) those interested in the branding potential of transmedia design; and iii) those involved in issues-oriented activism. In all three cases, the goal is to deploy transmedia design in order to extend participant engagement over time, but the quality and outcome of that engagement clearly differ among these three communities.

If we shift perspective a bit, however, and consider transmedia story design from the perspective of television, which has changed dramatically over the last decade, we arrive at a different understanding of its potentials. Janet Murray sketches this vector in an address to the 2012 EuroITV proceedings on interactive TV and video entitled 'Transcending Transmedia: Emerging Story Telling for the Emerging Convergence Platforms'; using what she has dubbed the four representational properties of digital environments' (2012: 9), namely the procedural, participatory, spatial and encyclopaedic affordances, Murray imagines the near future of television and the design potentials it offers. She highlights high resolution interactivity, and the possibility for creating greater immediacy in fictional worlds, as well opportunities for citizen journalists to contribute media to live events. She also predicts the evolution of immersive story worlds that more seamlessly transition participants from one platform to another. Calling attention to the fact that television produces both a sense of intimacy and collectivity, Murray also imagines the future of transmedia story design to include greater opportunities for audience members to experience a sense of collective viewership. The affordances of digital media are more fully developed in Murray's, *Invoking the Medium: Principles of Interaction Design as a Cultural Practice* (2011).

With regard to the actual practice of transmedia story design, transmedia production remains a relatively new process. However, a consistent step in the design process is the development of a transmedia 'bible', a document that attends to all of the components within a transmedia project. Gary P. Hayes offers a useful guide in a publication entitled 'How to Write a Transmedia Production Bible: A Template for Multi-Platform Producers' (2011). The document steps through each stage in the process, from identifying plot points and user scenarios to describing the forms of engagement the project seeks. The most useful component of the guide for those new to transmedia may be the 'user journey', which uses a timeline to chart the expected points of engagement for participants. This component underscores the fact that a transmedia production is a performance that unfolds in time and calls attention, too, to the fact that the performance is very much a collaboration with the participants who engage with the project. In this way, transmedia story design joins a collection of new workflows that respond to shifting platforms and potentials in contemporary story experience, while also resonating with processes that are increasingly collaborative and participatory.

**World Building**

Invited in 2015 to muse on the future of film for a round-up in the *Hollywood Reporter*, Nicholas Negroponte started by looking to the past: 'We used to believe that the medium was the message, that if you told the story in print, in film or on radio, the interaction between form and substance was such that story-telling was done by people well versed in each medium – three different interpretations' (in Kilday 2015: np). As we shift into a form of filmmaking that is increasingly computational, however, images become far more mutable; indeed these images become essentially information in a database. With this in mind, Negroponte continues his fantasy of future storytelling:

> Now imagine that, rather than writing, recording or filming a story, you model the situation in a computer. That model is like the DNA of the story from which multiple forms can be rendered. Want to see it as a movie? Want to hear it while driving? Want to read a book about it? In each case, when you choose, it is automatically rendered in that medium, with the skill sets of great directors, wonderful actors, postproduction excellence – but no people, just computers. (Ibid.)

Negroponte imagines a world in which the recording of stories has been replaced by the modelling of situations. What does it mean to model a situation, one that allows divergent story experiences to emerge?

The notion of modelling a situation comes close to that of world building as it has been developed by creative director Alex McDowell who has, since his design work on *Minority Report* in 2002, sought to refine a nonlinear storytelling workflow designed specifically to create a world – or situation – from which multiple stories across diverse
World building, in contrast, represents a creative workflow within the filmmaking and broader narrative media process that is nonlinear and builds from a world to a story, and indeed, allows each imagined world to generate multiple stories across multiple platforms. Rather than starting with a script, acquiring funding, entering post-production, then production and so on, world building insists that we start by designing a world, and then allow the stories that may be nascent within that world to emerge, bofed for multiple media platforms. McDowell imagines that this process could transform media industries, and it is significant in the context of this volume as it offers yet another example of a series of paradigmatic shifts, in this case moving from a linear step-by-step workflow to a contextual, collaborative process. It also is in step with shifts in narrative structure itself, which is increasingly more concerned with the representation of space. As Sean Cubitt points out with respect to many films of the 1990s and 2000s, 'space has usurped the privilege of time. Narrative is diminishing in importance ... while diegesis, the imaginary worlds created by films, becomes more significant' (2002: 26).

From 1990 to 2013, McDowell was an award-winning production designer known for his work on many feature films in addition to Minority Report, including The Lawnmower Man (1992), The Crow (1994), Fear and Loathing in Las Vegas (1998), Fight Club (1999), The Terminal (2004), Charlie and the Chocolate Factory (2005) and Man of Steel (2013). Each of these films boasts an inventive visual style that is at once ambitious and decidedly cohesive, and McDowell's efforts on each have contributed to his rethinking of the role of design in the film production process.

While McDowell brings a visionary approach to world building in the context of Hollywood, the concept predates his efforts to be sure. The history of literature is rich with examples of worlds that seem to generate stories. The Odyssey, for example, conjures a very rich world within which an epic tale unfolds. Similarly, the worlds created by J. R. R. Tolkien are extremely robust, and science fiction as a genre tends to privilege world building. However the role of worlds in discussions of narrative continues to grow. This fact is underscored by the publication of Storyworlds Across Media: Toward a Media-Conscious Narratology (2014), edited by Marie-Laure Ryan and Jan-Noel Thon. In the introduction, the editors explain that this work builds on Ryan's Narrative Across Media: The Languages of Storytelling (2004), with the replacement of 'narrative' with 'storyworld' registering their sense that the notion of 'world' has gained significance over the last decade. Similarly Daniel Yacavone's Film Worlds: A Philosophical Aesthetics of Cinema (2008) considers the 'world-like structures and experiences of narrative film' (2015: xiii) in the broader context of film theory and philosophy.

McDowell's use of world building is at once far more specific and expansive. He began to define the term and the process it designates through his experience on Minority Report. Rather than being given a script as the framework from which to begin to imagine the project's production design, McDowell and the film's writer started working on the project the same day. They began their creative process with a simple brief from Steven Spielberg about an apparently benign near future that is revealed to be undermining basic civil liberties in a dangerous way. The challenge for both was to conjure a realistic vision of that story's world.

'I said that if there's no script, let's look at the global context of the story, and start thinking about it that way,' McDowell said in interview (in Willis 2011a: np). To begin to imagine that world, an interdisciplinary group of people with diverse areas of expertise was convened. The group included Neil Gershenfeld, who helped imagine the ways in which the pre-cogs in the story would be entangled with the city; Harald Becker, who designed the cars used in the film; Stewart Brand, the editor of the Whole Earth Catalogue; novelist Douglas Coupland; John Undercoffer, who designed the film's gestural interfaces and is the founder of Oblong Industries; architects Greg Lynn and Frank Gehry; Jack Lanier, who developed some of the first virtual reality technology; Cdr. Shaun B. Jones of DARPA; and Peter Calthrope, an urban planner. The team started with Washington D.C. imagined fifty years in the future, and from there, extrapolated a story. What are the story drivers? And then what are the social and political drivers? Then they used an array of tools to create photo-realistic images of that world, basically visualising the narrative environment as design fiction before the story existed. While it was a practical necessity to have the director sign off on things that were not yet in a script as they progressed, it was also for McDowell a prototype for a new filmmaking process that focused first on context, and then moved through a nonlinear workflow to develop a story.

McDowell found the process on Minority Report revelatory. It was efficient; it used new techniques that were very productive; and it crafted a set of social relationships among participants that he had never seen before on a film set, and which proved very beneficial to the story. He dubs this kind of filmmaking 'sculpting in space'. Design, rather than being marginal to script and performance, becomes instead the central hub from which everything else emerges. He says of the process, 'It's more story-driven', but it can also account for the increasing complexity of very large-scale digital productions such as Avatar, where a design environment that can account for all the information needed by every department is found (ibid.).

McDowell illustrates the workflow using a mandala-like diagram to demonstrate the complexity of what he calls the 'narrative design process', an endeavour that he further characterises as a 'progressive, non-linear workflow adopting and adapting to a digitally-based process that is fundamentally changing our industries' (ibid.). He also describes the process of world building as a holistic approach that takes narrative as its core, and develops 'the logic of the world from the narrative', and continues to build a world based on this logic.
With this approach, one can then extract any and all design and storytelling, the wayfinding and experience for the audience, and develop the narrative outcome of any problem you throw at the world. The logic comes out of this immersive world building approach to the design will answer its own questions. (Ibid.)

In order to extrapolate the specific contributions of design to new workflows, McDowell founded the World Building Media Lab and the World Building Institute, both located within the School of Cinematic Arts at USC, and he is the founder of 5D Global Studio, dubbed ‘a multi-platform, cross-discipline design studio that builds worlds: future reality not science fiction’. All three entities are dedicated to world building as a fundamental creative process.

Since joining the USC faculty in 2011, McDowell has continued to work with collaborators from the realms of architecture, urban planning, opera, theatre, neuroscience, engineering, biology and more to explore the practice of world building more fully; this work has taken form as international workshops as well as via large-scale events in which hundreds of people come together for a weekend-long design investigation. These events began with the 5D ‘The Future of Immersive Design’ conference, which took place on the California State University campus in Long Beach in 2008. In reference to the conference, McDowell explains, ‘The neural sparking between left brain and right brain is at the core of 5D – we are moving into a landscape where art and science, design and engineering are inseparable. At their intersection the new laboratory for the future of our narrative crafts lies’ (in Blitz 2009: np).

The two most recent of these events (at the time of writing) were both titled ‘The Science of Fiction’, hosted in 2013 and 2014 in Los Angeles. Both events created circumstances for the robust exploration of world building’s potentials. The first event divided participants among six groups to explore Los Angeles in the near future after the water level has risen, flooding parts of the city. The topics addressed by the groups included new forms of architecture, transportation, design and biology, with the goal not simply of imagining the world of the near future, but more specifically refining the world building collaborative process. McDowell described the event in his opening remarks as the ‘anti-TED’. In contrast with TED talks, which provide a forum for inspirational speakers, world building acknowledges that the audience members often know more than the people on stage; in this way, there are as many participants as leaders. John Seely Brown offered additional context during the event’s framing, suggesting the larger potentials for world building beyond narrative and asking, ‘How do you create a toolkit for change? How do you really begin to think about contexts, moving beyond cities into whole ecosystems?’ He encouraged the audience to be willing to design for emergence rather than fixed entities, and to focus on practices and systems that might contribute to the world building process.

The second ‘Science of Fiction’ event refined the world building process, in this case expanding on the efforts of McDowell’s students who had been imagining the world of Rio, a city formed through the imaginary collision of Rio de Janeiro and Los Angeles. The event further adopted the use of an inventive system of prompts developed by School of Cinematic Arts faculty member Jeff Watson to at once constrain the imaginative process and guide it in particular directions. Once again, the audience was divided into groups and tasked with imagining the near future, with a focus on articulating an existing context that participants could engage.

Through these massive, participatory events, McDowell continued to extrapolate the processes that might engineer a storytelling workflow, defining world building as an experiential, collaborative and interdisciplinary philosophy, one that integrates imagination and technology with the goal of creating a story space that can frame every aspect of the process, from inception through iteration and prototyping, into making and finishing. He also identified the characteristics and steps in the world building process:

- World building is coherent: we start by establishing the logic of the world.
- World building is immersive: it assembles the components of the story world, offering a means for becoming embedded in the world being created. This aspect of the process is vital.
- World building is collaborative and interdisciplinary: it imagines a return to tribal storytelling, to the aggregation of stories from multiple storytellers, passed on through generations. No longer subject to the single author, world building supports spherical storytelling where the viewer’s gaze is liberated, and narrative is embedded in every aspect of the world.
- World building is scalable: it involves defining the boundaries of the world in a manner that is fractal. The world can be as small as the house in *Fight Club* or the terminal in *The Terminal* and still be a world. The world, then, is any coherent space where stories take place.
During the second 'Science of Fiction' event, McDowell also offered new terms for the conventional components of story, noting that 'character becomes agent; environment becomes context; and viewpoint becomes author, audience, user or viewer', adding, 'The tension among these is core to every story, and forms the basis of the fluid development of every world.'

The world building methodology has been developed iteratively through McDowell's teaching; given his penchant for collaboration, it is no surprise that McDowell frequently collaborates with other educators. For the fall 2013 iteration of his graduate world building studio, for example, architect Ann Pendleton-Jullian participated, helping codify the world building process even further. He has also co-taught with Peggy Weil, and each iteration of his course has involved connecting with at least one other international course. In these design studios, the students move through a four-stage process that constitutes the world building practice. The first step asks a 'What if?' question. This part of the process is expansive and conjectural. For Minority Report, the 'What if?' question asked, 'What if we were living fifty years in the future?'

The second step in the world building process is to establish a series of logic points. For Minority Report, the logic points included the following: the future is not the dystopic world we frequently imagine, but rather a more benign future; the setting is Washington D.C.; there are pre-cogs who have the ability to predict a crime before it occurs; and the city exists within a fifty-mile radius because that is as far as the pre-cogs can sense.

The third step calls for the elaboration of domains that will help answer the 'What if?' question, but within the constraints suggested by the logic points. Here, experts in urban planning, security, technology, architecture and so on can contribute. To establish a powerful origin for the story world, the team needs to explore everything from physics to topography, from behaviours to social structures and language. This stage also involves crafting physical artefacts that might be a part of this world. Experimentation, imagination and design are leveraged to help understand the landing points for the story. The fourth step captures the visual and conceptual parameters of the world in a story bible.

In addition to the stages of world development, the world building methodology entails exploring a horizontal plane, which constitutes the broad definition of the points of logic, as well as a vertical plane, which entails detailing the specifics of the world by drilling down into key topics. 'In this way, each core sample makes the world more robust through its examination of subject with respect to context of the world as a whole,' explains McDowell (in Willis 2011: np). He continues:

And we look carefully at scale across the horizontal and the vertical – the scale of the individual, the community and the world at large; and finally we run narratives through the world, looking to understand the impact of the individual, of each aspect of the world, at every scale, all exacting influence of the progress and development of the character. (Ibid.)

McDowell has gone on to deploy world building beyond the entertainment industry. He used world building to imagine the future of a small village in Saudi Arabia, for example, with the goal of establishing a fully sustainable community. Entitled Al Haydhia Village, the project planning for the village drew on elements of cinematic visual design and interactivity to create a virtual world within which the research team could stage possible future scenarios and visualise possibilities for the participants. These components were also deeply grounded in research – architectural, agricultural, tribal and cultural – so that everything imagined for the future was rooted empirically within the context of a sustainable community and permaculture.

World building, with an emphasis on understanding context as well as content and its dedication to a participatory, collaborative process, resonates with the key elements of a posthuman ethos. World building is an endeavor deeply connected to diverse systems, and rather than relying on the singular vision of a writer or director, privileges collective vision; rather than relying on a linear unfolding, it works best through simultaneity; and rather than crafting a primary object at the centre, usually a film, with ancillary projects hovering on the edges as if in orbit, it creates the potential for multiple story forms to emerge in conjunction.

McDowell continues to hone this process, exploring emerging virtual, augmented and mixed reality platforms and their dramatic impact on contemporary storytelling:

With the explosion of VR in the past three years, I argue that we have entered not only the posthuman but the post-cinematic era, where spherical, 360-degree narrative world-space produces the absolute rendering of the single author’s control over the viewer’s gaze. These new media, whether they persist in this form or become quickly and radically modified, have already disrupted the form to such an extent that we all need to reconsider our core creative capabilities. World building, which by definition defines a spherical holistic basis for the logic of its emergent narratives, is likely to be the basis of new creative practice. (Ibid.)

Finally, world building is also a process that respects the increasing significance of the audience. Rather than remaining passive consumers, audiences are increasingly involved in the processes of creation. We can also draw analogies between world building and a networked culture. The qualities lauded in world building – its emphasis on the nonlinear, the collaborative, the participatory and the dispersed – certainly echo those characteristics that constitute a networked culture. To what extent does this alignment contribute to the creation of subjects who readily acquiesce to this culture? In an essay entitled 'Remembering the Technological Unconscious by Foregrounding Knowledges of Position', Nigel Thrift describes an emergent 'embodied phenomenality':

This new phenomenality is beginning to structure what is human by disclosing 'embodied' capacities of communication, memory and collaborative reach in particular ways that privilege a roving, engaged interaction as typical of 'human'
Thrift is querying the ways in which computing, in becoming ubiquitous, contiguous and syntagmatic in its relationship with humans, contributes to a standardisation of space – space that can now be tracked and traced. This standardisation of space, in turn, interpolates its human occupants not as individuals but as necessary components of large-scale data flows and patterns. In some ways this decenage of the individual from the narrative of consumer culture resonates with the systemic focus of world building; on the other hand, it threatens a kind of depersonalisation that is antithetical to world building’s core investment in the potential centrality of any given component of the world as the focal point of its own micro-narrative. Within such a totalling system, individual tactics of resistance are, as the saying goes, futile. Except at a speed and scale that rivals that of the network itself, we can neither game such a system nor escape from it. It is within just such a milieu that the hunger for a return to long-challenged notions of individuality and authenticity drives some of the most compelling methods of performance and directing.

Self as Source: The Technique by Joan Scheckel

In the heart of Hollywood on a smallish street just north of Santa Monica Boulevard, there exists an expansive, open studio space that serves as the home for a burgeoning creative community – for directors, writers, actors and other artists seeking a new form of storytelling that connects directly to their own experience. Hundreds of participants have struggled to find and articulate meaning in the sunlit room, sweating, leaping, running, dancing, moving, thinking and learning. All of this work is dedicated to tapping into the untapped practices of knowing through the body, in connection to others, and by via a form of storytelling attuned to a new century.

The space serves as the home to the Technique, an embodied experience of narrative creation designed to elicit stories by tapping into the self – one’s own experiences, passions, fears, mysteries – as the source for storytelling. Created and honed by Joan Scheckel for more than twenty years, the Technique has become a magnet for artists seeking new, genuine ways to imagine stories in the twenty-first century both individually and in community with other artists. Scheckel, who is herself a director, writer and producer with a background that also includes work as an actress and singer, has guided many of the most vital new voices in contemporary cinema to find this form of storytelling. These artists include Jill Soloway, who studied the Technique and then collaborated with Scheckel to create her award-winning feature film Afternoon Delight (2013). Continuing her collaboration with Scheckel and the Technique, Soloway further tapped into her own experience and launched the ground-breaking Amazon series Transparent (2015–), on which Scheckel serves as Consulting Producer. Guided by Soloway and Scheckel, the entire Transparent team uses the Technique, from the directors, writers and actors to the cinematographer and crew; this broad immersion by the entire team in a new process gives the show its sense of intimacy and dance-like flow.

Writer-director Niki Caro has also studied the process and invited Scheckel to use the Technique to both script doctor and workshop her Academy Award-nominated film Whale Rider (2002). Mike Mills is also a student-turned-collaborator. Scheckel served as executive producer on his feature Beginners (2010), which earned an Academy Award for Christopher Plummer as Best Performance for an Actor in a Supporting Role. Jonathan Dayton and Valerie Faris studied with Scheckel and collaborated with her on Little Miss Sunshine (2007). The film earned two Academy Awards, as well as the AFI’s award for Movie of the Year. The list of screenwriters and directors who have studied the Technique with Scheckel includes artists as diverse as Rupert Sanders, Mark Romanek, Sacha Gervasi, Richard Press, Alison Maclean, Jake Scott, Patricia Cordoso, Bryce Dallas Howard, Sarah Shapiro, Mark Ruffalo, Nick Jarecki and Miranda July. The list of other films that have benefited from exposure to the Technique is similarly disparate, and includes Jesus’ Son (1999), Real Women Have Curves (1999), Rocket Science (2007), Never Let Me Go (2010), The Future (2011), Arbitrage (2012), Snow White and the Huntsman (2012) and unReal (2015). With all of these projects and artists, Scheckel’s goal was to integrate meaning, action, feeling and structure through a carefully honed process.

Rather than looking outward to existing screenplay structures and mythic paradigms, whether it is the three-acts embraced by Hollywood or the hero’s journey, the Technique begins instead by turning inward, looking to the self as source, not for
subject matter necessarily, but for meaning:   ‘How do we access something so elusive as the inner life, that feels in the unknown, the unseen, the ungraspable terrain of the soul and the mind? ... This self speaks in silences and whale songs, helpless gestures and unhidden vulnerabilities, slips and sighs, dreams and spasms, shudders, stillness and surprise. How do we bring that to form?’ Scheckel asks (in Willis 2013: np).

The Technique is dedicated to tapping the self as source, and then guiding that inchoate material into an appropriate form. The form is not dictated from the outside, but instead, emerges from the theme; the form comes to embody the theme. Scheckel refers to the theme as the Nugget, noting that structure is built from that nugget, not just intellectually but through actions that one can both feel and do. A great deal of the work in gleaning the brilliance of the Technique is in helping artists discover and then articulate that often hard-to-discern core.

There are four other elements core to Scheckel’s teaching. First, essential to the Technique is establishing a visceral connection with the body. Workshops begin with an intensive physical workout called the Receptivity Warm-up, designed to ground the body, starting with treading the feet, then gradually moving the attention downward from the head to the feet by using slow circles in each direction from the head down to the shoulders, opening the rib cage, circling the hips, knees, ankles and then again grounding the feet, using the floor to feel all facets of the feet’s shape and its firm connection to the floor. After enough time awakening the connection to the body, participants begin to move around the space, visually receiving their surroundings and each other with a gaze that seeks to connect. This deep receptivity with the body, the environment and the other participants allows the group to co-create the environment for the work to come. Where much of contemporary filmmaking pedagogy is cerebral and focused on telling stories through proper structure, a structure received from tradition, the Technique instead works from the body to enable a means for discerning and welcoming a sense of radical openness and presence, and while there is attention to each participant’s own sense of self, there is simultaneously connectivity with the group and work space. Structure emerges from the self, and from the story; it is not forced into the story paradigms that already exist.

Scheckel has articulated the 34 aspects of the Technique to elicit the openness required for discerning one’s story, which then expands to focus awareness on the process of seeing. Too often, most of us have forgotten how to see the world around us; the Technique aims to reawaken this ability, deftly illustrating to participants the ways in which their perceptual capacities are diminished and offering practices to reawaken awareness and attention.

Second, rather than focusing on conflict, which is the machine that propels much of Western storytelling, Scheckel instead advocates for contrast. As she teaches in her workshops, classical Hollywood filmmaking drives toward crisis; dramatic tension is produced through conflict; and the meta-narrative in all of these stories concerns the struggle for power. Scheckel, however, invites storytellers to explore the more elaborate and nuanced vocabulary of contrast. Contrast, according to Scheckel, works through rhythm and shape. Rather than catalysing oppositions, it seeks to develop a much broader palette of structuring potentials, opening up the possibilities for articulating the inner life. Scheckel likens the reductive capacity of the conflict-based structure to having a brilliant mind but only a five-word vocabulary with which to communicate. Her goal is to expand our options and in this way, to present a greater vocabulary for understanding truth, connection and the complexities of our emotional lives.

The third key component of the Technique is based on properly identifying the Nugget for one’s story. If, as Scheckel believes, storytelling is the expression of the inner life that craves to be known, seen and shared, and if our work as humans is to derive meaning through a radical sharing of experience, we need to identify our theme with precision. She works from the premises above, such that the theme must be experienced through the body — it must be felt as much as known — and it is not based on conflict. The theme means bringing together meaning, structure, action and feeling. Rather than being an abstract concept or clever cerebral metaphor, the theme must be done and felt. The theme is also not what the characters are talking about. Instead, it refers to what they are doing and feeling structurally in the movie. According to Scheckel, every theme has a structure embedded within it, and this needs to be felt through all levels of the mise-en-scène. So, the clearer storytellers can get about the thematic intention, the more precise and illuminating they can become with the structural actions of the movie.

The Nugget, once determined, will in turn dictate blocking, pacing, the world and the relationships in the project. The major tool storytellers need for this work is the awareness that action and feeling are linked.

Scheckel’s Technique moves from the Nugget to an interlocking set of elements — including character, blocking, pacing, beats, the emotional logic and rhythm — with more than 34 possible levels to consider in crafting the story.

The fourth key component in the Technique is action. For Scheckel, action and feeling are inextricably connected. ‘I feel something, so I do something. I do something and I feel something. You cannot separate the two,’ she says. ‘However, when we go to think about the actions in the storytelling process, too often we separate from feeling’ (ibid.). Scheckel defines action in this way:

Action is that which calls story and performance into being. It is the process of exploring carefully selected verbs that you can both do and feel in order both to viscerally understand the essence of your story and to engage the process of bringing that story to life. It entails investigating verbs, physically, emotionally and intellectually, testing them, feeling their impact on your body, and gauging that impact for its resonance with the story you are trying to tell. (Ibid.)

And again, understanding action requires being consciously attuned to your body.

While the Technique aims to reconnect students to their bodies and their inner lives, Scheckel does not relinquish the role of the intellect. In teaching the Technique,
The effect of the Technique can be transformative. Indeed, the emotional authenticity of Soloway's Transparent derives from the Technique. Soloway has said this herself, explaining during a keynote address to a Film Independent Forum in October 2014 that prior to Scheckel's teaching, she lacked a technique for filmmaking; Scheckel gave her the tools she needed. Soloway went on to explain in her lecture that the Technique ‘can be very simply boiled down to the question: “What are you doing to get what you want?” She continues,

It’s a question I learned to ask of a character – what are they doing to get what they want – in this movie or sequence or scene or beat or moment. It can also be asked of the cinematographer – what does the camera want? The prop, the art direction, the light, all of these elements should be doing something. They should want something. (in Ohanesian 2014: np)

For Transparent, Scheckel worked not only with Soloway, but the entire cast and crew, and even executives at Amazon. Describing this early rehearsal process, cinematographer Jim Frohna says, ‘The time spent was not about running scenes, but about exploring character, relationship and emotion – all with music and through movement’ (in Valenti 2014: np). He explains that as they moved beyond rehearsal and into production, this sense of connecting to the project through feeling and action continued:

This whole approach to filmmaking is intuitive and allows that same sense of exploration and ‘play’ that we used in rehearsal to be carried over to the set. For Transparent ... Jill and I don’t feel the need for a storyboard or even even a shot list. Here, the actors don’t have marks and they are not restricted by a lighting set up because we generally light for the whole scene. As well, I like to operate the main camera and work, as Jill would put it, like the ‘unseen player’. (Ibid.)

The experience for the Transparent team undoes the holistic vision of the Technique, and its applicability across multiple art forms. ‘Lived in theatre, expanded in film and now catalyzed in the episodic form, the Technique has met its time,’ Scheckel notes; ‘Transparent shows that new rhythms and stylistic tonalities are allowable’ (in Willis 2016: np). Further, Scheckel’s approach acknowledges the intra-subjective nature of collaborative art-making, and insists that the industrial, linear process that characterised filmmaking of the last century simply does not align with our current moment. Further, the Technique is not merely for writers, directors and actors, but can be employed by anyone seeking a connection to the self as source for authentic storytelling.

As she continues to share the Technique, Scheckel is deeply committed to catalyzing us beyond the strictures of a story structure that may have worked for another century but is inadequate to the needs of the post-cinematic, posthuman era within which we exist. Like many of the examples included already in this book, she moves between an emphasis on the material and the embodied, and relinquishes an outmoded understanding of narrative based on conflict and power.

Post-photographic

‘It’s time to stop talking about photography,’ Stephen Mayes announced in a post to the Time Magazine website on 25 August 2015, calling attention to computational photography and its difference from analogue photography on a national platform. Using an unfortunate metaphor about childhood development, Mayes distinguishes between analogue photography and the act of data capture, which is what happens when we use our smart phone or digital camera to take a picture. While the acts may resemble each other in some ways, they are radically different. He writes, ‘The smartphone’s microphone, gyroscope, accelerometer, thermometer and other sensors all contribute data as needed by whatever app calls on it and combines it with the visual data. And still that’s not the limit on what is already bundled with our digital imagery’ (2015: np). While Mayes may not have written the clearest analysis of what he dubs the ‘next revolution’, the article underscores the growing cultural realisation of the shift in visual culture and the practices of image capture.

Filmmakers and visual artists have begun to exploit this shift, moving toward what’s been dubbed the post-photographic. One of the earliest examples of this direction is music video director James Frost’s video for Radiohead’s ‘House of Cards’. The 2008 video did not use cameras to capture image but instead was created in collaboration with director of technology Aaron Koblin and scientists at UCLA, who used high-tech scanning and laser systems to capture and then visualize 3D information of the band’s lead singer, Thom Yorke. The resulting images are gritty bits of seemingly evanescent data that embody the song’s sense of longing. The video also suggests the significance of digital information as an aesthetic form, and points to the fact that photography isn’t what it used to be. Where photographs were once records of light captured on emulsion, the contemporary digital photograph registers data, some of which originates with reflected light striking a sensor, but the rest of the process is strictly computational. Contemporary cameras and photographs are part of a reconfiguration that moves us from the realm of representation to that of information and algorithms. Similarly, although virtual cinematography may resemble traditional cinematography in some ways, it was founded on – and functions via – an entirely different logic.

Photogrammetry designates one main category for understanding the post-photographic through the deployment of remote sensing for generating images. Using
processes of sensing, measuring, recording and analysing, photogrammetry is defined by Shaun Foster and David Hallstein as 'the process of using photography to determine geometric measurements of objects' (2014: 2). More specifically, they note that photogrammetry 'is the science of extracting reliable measurements from two-dimensional (2D) images, usually photographic' (ibid.). They also define stereophotogrammetry as 'estimating 3D coordinates of an object by comparing multiple photographic images taken from different positions' (2014: 3).

To clarify: photogrammetry is akin to taking a picture with the main exception that instead of capturing a single image, you instead capture multiple images; these multiple images understand where they are spatially relative to all of the other images, allowing you to then stitch the images together to create a mosaic or composite image that contains a high degree of detail, both representational and topographic.

Photogrammetry was first undertaken in the 1850s, and the various histories of photogrammetry list dozens of experimenters who participated in advancing the tools and techniques in this new field. In the 1850s and 1860s, for example, Aimé Laussedat, a French scientist, developed some of the first techniques of photogrammetry as he attempted to use aerial photography — by taking pictures from tall buildings and from balloons — to create more accurate topographical maps. Laussedat is also credited with creating the phototeodolite, which combines a camera with a surveying tool that measures horizontal and vertical angles. A stereoscopic component was introduced in 1901 when Henry Fournac developed a tool for capturing stereoscopic photographs. The Austrian Society of Photogrammetry was established in 1907, and the first International Congress for Photogrammetry took place in 1913, providing a venue for scientists to share information and mapping techniques. Peter Collier (2002) divides the history of photogrammetry into three more phases following the initial explorations of Laussedat and his contemporaries. It advanced during World War I as the need both to gauge the location of enemies as well as to assert national borders came to the fore. The invention of powered flight brought further advances to photogrammetry during the 1920s for a third phase, and in the 1930s, which constitutes the fourth phase, techniques for aerial mapping were further refined and codified.

Paul Debevec's *The Campanile Movie* (1997), created as part of his PhD research at the University of California, Berkeley, deftly demonstrates the basic principles of photogrammetry and their early application within the film industry. The film is made by combining a series of photographs of the prominent clock tower overlooking the UC Berkeley campus with photogrammetry. Debevec, now a faculty member at USC, and his colleagues took photographs of the tower from a variety of angles; they also used a kite to capture images otherwise unobtainable. Geometric data was extracted from the images, and then a software application called Façade was used to integrate the 3D model with the photographs; from there, Debevec created a virtual camera move, playfully shifting between a 3D model of the tower and the tower itself, cheerfully confusing the two. The short film was screened in the Electronic Theatre at SIGGRAPH in 1997. Debevec's work had an instant impact in Hollywood, suggesting a pathway to the creation of bullet-time sequences in *The Matrix* (1999) two years later.

Contemporary photogrammetry has many uses. For example, School of Cinematic Arts faculty member Eric Hanson, co-founder with Greg Downing of xRez Studio, a studio dedicated to ultra-high-resolution imaging based in Santa Monica, California, used photogrammetry in 2007 for the Yosemite Extreme Panoramic Imaging Project; the goal was to capture a gigantic snapshot of the massive walls of Yosemite National Park in order to study deadly rockfall events, and perhaps to develop a means for predicting their occurrence. To create the Yosemite image, twenty photographers were stationed throughout the valley in strategically located sites; working simultaneously, each photographer captured five hundred overlapping images. These image collections were then 'draped' over a terrain model of the valley, combining the photographic quality of an image with the cartographic accuracy of a mapped topography. This combined information created a three-dimensional spatialised image. For the final step in the process, Hanson used a virtual camera to 'fly' through this composite, three-dimensional valley to craft a massive single image which essentially builds on the ten thousand individual frames captured by the twenty photographers. 'We created a landscape photograph devoid of perspective, a first in landscape photography,' Hanson explained in interview (in Willis 2014: np).

Used primarily in the last century for geographic mapping purposes, photogrammetry has emerged as a key process in 3D computer graphics and visual effects sequences in films, as well as in virtual cinematography and modelling more generally. The technique makes what was once a very labour-intensive process of 3D modelling far simpler and faster by using the information gathered through photogrammetry to generate 3D models.

Photogrammetry has also become an increasingly DIY activity, thanks to easily accessible resources. Microsoft’s Kinect, for example, was offered with the Xbox 360 game console in 2010, uniting a camera, an infrared projector that serves as a depth sensor, and a microphone. By analysing visual information generated by the camera and depth information generated by the infrared sensor, the Kinect allows users to interact with the computer through gestures. But it also serves as tool for capturing your own volumetric data. The DepthKit, formerly known as the RGBD Toolkit, was designed specifically to take advantage of this attribute of the Kinect. Created by James George, Alexander Porter and Jonathan Minard with support from the Frank-Ratchye Studio for Creative Inquiry at Carnegie Mellon University, Eyebeam Art + Technology Center and YCAM InterLab, the kit brings together the depth sensing capacities of Microsoft's Kinect or the Asus Xtion Pro with the photographic capacities of an HD DSLR camera to capture imagery that integrates photographic and spatial attributes, and allows artists to produce compelling, volumetric video images that become navigable when imported into a 3D environment.

Other relatively low-tech software and hardware solutions exist for DIY experimentation with the conjunction of images and data through photogrammetry. Autodesk's
Chapter 3
Live Cinema

Perhaps one of the most striking embodiments of the post-cinematic/post-humanist conjunction occurs in a practice known as live cinema, in which artists dismantle and reconfigure the elements of the traditional cinematic apparatus in order to craft an event that straddles the boundary between mediated experience and live performance. Dubbed a ‘beautifully located oxymoron’ by Douglas Kahn (2011: 256), live cinema concretises the conflicting impulses of contemporary culture—the desire for presence in a world seemingly growing more and more evanescent, and the contradictory appeal for dispersal, divestiture and dissolution so much a part of networked existence. For Kahn, ‘the oxymoron derives from the fact that cinema is a form of inanimate storage’ and as such, live cinema becomes, oddly, a ‘performance of a recording’ (2011: 258). However, this conception of live cinema does little to illuminate a number of works that compound liveness and which, I argue, work to limn the boundaries of the cinematic as well as existence itself within a networked culture. Live cinema specifically expands beyond the performance of a recording in order to query the relationship between live and recorded, and to muddy—or even refuse—the boundary between the two. Pushing a bit further, viewing this work within the context of a networked culture, we must note that the formerly distinct act of making a recording has been supplanted by the activity of designing the conditions for an ongoing and ambient form of processing. In place of optical media we have technical media, and in place of the ‘things’ of media past—videos, movies, DVDs and other objects—we have instead systems, networks, assemblages and environments. In short, in the context of computers and computation, we shift from objects to processes, and from notions of a singular identity to a kind of intra-subjectivity. Artists have responded by creating works that stage and enact the transition from one paradigm to another, and which call attention to the challenges we face in this upheaval. In this chapter, I will explore the work of four artists working in the realm of live cinema...