

## Critical Digital Studies: An Introduction

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*Critical Digital Studies* represents a creative search for a new method of understanding digitally mediated culture.

From the spectacular emergence of new media innovations such as blogging, podcasting, flashmobs, mashups, and RSS feeds to video-sharing websites (MySpace, YouTube), Wikipedia, and massively multiplayer online role-playing games (MMORPGs), the *how and what we know* of contemporary society, culture, and politics is continuously being creatively transformed by strikingly original developments in technologies of digital communication.<sup>1</sup> To the challenge of understanding the implications of technological innovations, *Critical Digital Studies* responds by developing a new method of critical digital studies: *its scope* – full-spectrum knowledge of the digital future; *its method* – media archaeology; *its practice* – crossing boundaries; and *its goal* – bending the digital future in the direction of creative uncertainty.

Conceived as a global forum for critical digital studies, this book represents a new style of thought directly emergent from Net culture itself. Inspired by the same digital spirit that gave rise to the Open Architecture Movement, Shareware, and Web 2.0, *Critical Digital Studies* may be visualized as a *creative mashup* – a method of critical digital studies that creatively mixes the very traditional human demand to understand the world in which we live with the new ways of analysing, relating, communicating, and living that are digital reality today.

Representing many of the leading digital theorists in the field of new media analysis, *Critical Digital Studies* links the digital future to the question of knowledge. Here, *digital knowledge* – knowledge of surveillance strategies, knowledge of meta-media, knowledge of advanced cyber-warfare, knowledge of information technology, knowledge of gendered information, knowledge of peer production, knowledge of ‘cyborg mothers’ and ‘biophilosophies’ – is placed in the service of a digital culture that is struggling to be born, survive, and flourish.

### Understanding the Digital

Looking around the crowd, even during the liveliest numbers, there was an eerie silence. At times, the atmosphere was more like a high-Catholic service than a pop concert. In

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the velvety dark, 10,000 points of polychrome light glimmered as cellphone screens were lit and turned reverently, towards the stage.

A sizable part of the audience was photo- and sound-recording the event, and another sizable part of the audience was transmitting Coldplay's performance to absent friends via mobile phones.

To get the best image with a mobile you keep arms outstretched and the whole body rigid – as if in prayer. No jumping or jiggling to the beat. At various points in the set the stage backscreen projected a reciprocal mobile image of the audience.

Aware of this new concert technology, (Coldplay's) Chris Martin routinely asks the audience to take a simultaneous camera-phone snapshot, creating a sheet-lightning effect. Like Bono, he will instruct them to fire off a barrage of mid-performance text messages on behalf of Fair Trade.

The phone becomes an umbilical connector between artist, audience and outside world.

John Sutherland, 'For those about to rock: We turn on our cell phones for you'<sup>12</sup>

The explosive growth of the Internet is already common knowledge. What is less noticed, however, is that the digital future is definitely not limited to the question of the Internet, but has now become a very complex aspect of life. In the 1960s, Marshall McLuhan could write with confidence of a modern culture in which the different historical phases of the oral versus the literate, the mechanical versus the electronic, could not only be theoretically distinguished from one another but with their clear boundary divisions could be subject to styles of critical interpretation relative to the cultural singularities of each. Consequently, McLuhan could speculate eloquently on the emergence of the 'global village,' analyse 'the medium as the message,' and contrast tribal cultures with their privileged oral sense with electronic crowds worked over by technologies of visualization. What he did not do, and, in fact, at that epochal moment of division had no need of doing, was to write equally eloquently of what would succeed electronic culture, namely, the complex multiplicity that is the digital future with its porous and blurred boundaries, clashing global villages, multiple media, and often contradictory messages. In retrospect, McLuhan's lasting contribution may well have been to represent, in all its creative utopianism, that great technological division in which for the last time it would be possible to distinguish clear border lines among alternative media, to attest to the existence of firm boundaries among the human, the mechanical, and the organic, or to speak with confidence of the necessity of media literacy rather than the more ambitious, and certainly difficult, task of the plurality of media literacies required to negotiate today's increasingly dense digital matrix. While McLuhan could distinguish with considerable intellectual impact the difference between a culture of the ear and a culture of the eye, his thought did not anticipate a much more ambivalent technological future, namely, one in which technologies of the ear (iPods) and the eye (webcams) combine with hidden technologies of the clothes we wear (RIFFs), the food we eat (genomics), the

secrets we keep (digital archives), the words we speak (podcasts, satellite radio) to produce a digital culture that is as complex in its implications as it is ambivalent in its meanings. If McLuhan's electronic culture succeeded the (industrial) world of mechanical technologies, then today the media world built on the house of analogue electricity has been displaced by the digital universe constructed of binary codework.

When technological society is no longer understandable simply in terms of the globalizing spectacle of electronic images but in the more invisible, pervasive, and embodied language of computer codes, then three immediate implications follow. First, digital culture literally remaps, rewires, and recodes life itself using complex algorithms. When the theorist Katherine Hayles noted in a recent interview that 99 per cent of all communication is not humanly understandable because it is machine-to-machine interaction, then there is an urgent necessity, if we are to understand what is happening to us as we are being worked over by the codes, to decipher the meaning of codework, and, more precisely, to understand what complex things happen when codes are actually embodied, when codework becomes the culture within which we thrive, the means by which we download the music we love, the invisible apparatus that supports the communications within which we live. Second, the movement from the (electronic) current to the (digital) code implies some very serious blurring of boundaries where clear distinctions among flesh, machine, and images become increasingly more difficult to ascertain. Third, accelerating the speed of electronic culture, the new digital universe moves in two opposite directions simultaneously. As codework, digitality moves at the speed of light. But when the digital universe interacts with the putatively solid objects of society – bodies, politics, economy, gender, sexuality – its speed is suddenly altered, inflected by the very real materiality of a world that is, for all its digitality, still all the more physical, concrete, stubborn, as regressive politically as it is progressive. In contrast to the infectious utopianism of the original visionaries of the electronic age, from Marshall McLuhan to Teilhard de Chardin, no necessary human future is implied by the emergence of the digital world. Although code-works definitely exert a massive, structural influence on human affairs, influencing by programming design the how, what, when, where, and why we live in these coded times, immense room remains for contingency, chance, and sheer will-power in this world. Neither inevitably utopian nor dystopian, digital reality is an open future, determined in the final instance by the play of human interests, desires, and power that have always represented the elementary matter of the human condition.

As we find ourselves thrust from the electronic media into digital reality, we are not left without guides to our technological future. After McLuhan, the question of the digital has attracted the passionate attention of a large community of theorists who, speaking with often very different voices and certainly from dramatically unique national localities, have sought to understand the real world of digital culture. They have sought

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to understand digital reality not only in terms of its local manifestations, but to comprehend from its very interior a fast-changing culture within which they themselves are active participants in the larger discourse-change that is represented by this movement from the mechanical to the electronic, and thence to the digital. Themselves caught up within a technoculture that is literally moving at light-speed, these theorists of the digital have had of necessity to develop a style of thought, a method of inquiry, and a digital vocabulary that would not only illuminate the darkest recesses of digital reality but also express something of the power of the digital inflection.

It is certainly contrary to the (recombinant) spirit of digitality to assign genealogical naming rights to the founding mothers, fathers, sons, and daughters of critical digital studies. Nevertheless, there is one name that continues to haunt critical digital studies, that of the German philosopher Martin Heidegger. In his classic essay, 'The Question of Technology,' Heidegger posed the fateful question that ever since has represented the hauntology of the digital age. For Heidegger, technology was a paradox. Not self-birthing and certainly not self-generating, the question of technology could only be posed as part of a larger query, namely, to what should we ascribe the dynamic, seductive power of technology? For Heidegger, technology could not be understood technologically for the simple reason that technology is not simply technical, but has everything to do with the more powerful currents out of which contemporary society has been fashioned – the planetary drive to 'conquer' nature; the politics of subordinating human nature; the will to expand our society, culture, and, in the last instance, 'ourselves' by means of technologies of communication; the greater historical project of remaking ourselves as technological beings. Heidegger sought his own philosophical resolution of this question by means of an increasingly complex position on the question of the technological that came, in the end, to recognize technology as containing possibilities for intense human creativity ('in-dwelling') and utter human devastation ('completed nihilism').

*Critical Digital Studies* is about 'the question of technology.' How could it not be? The sheer intensity, volume, and accelerating effects of the question of technology in its contemporary manifestation as digital reality have about them an *urgency* that demands the most serious reflection. If we are not to be swept away as so much digital debris in the technological maelstrom, if thought itself is not to be terrorized into passive submission by ubiquitous technologies of surveillance, if critical reflection – one of the enduring hallmarks of *being human* – is not to be blasted apart by a culture of (technological) distraction, then there is a desperate need to rise again to the challenge of the question of technology.

When thinking refuses to accommodate itself passively to the narrative line created as part of the justificatory logic of technology itself, then critical digital studies must itself absorb fully the quality of technological paradox. Curiously faithful to the spirit of technology, thought must simultaneously expose the as yet unrevealed implications of the historical project of technology, while at the same time, represent, in all

its incommensurability, the full dimensions of the greater technological destiny within which we now find ourselves carried along. This is exactly what successive generations of thinkers who have risen to the Sisyphean challenge of answering the question of technology have done.

#### McLuhan's Doubt: Pathways to the Digital

Approaches to understanding the impact of technology upon society, politics, and culture are often divided into the clashing perspectives of technology as utopia or domination; but these binary perspectives on the question of technology miss entirely the real-time history of the digital inflection: a dramatic history that has everything to do with digital reality as a story of complexity. In the industrial age of mechanical technology, and even in the modern era of electronic technology, it was permissible (perhaps even salutary) to seek understanding of technology in terms of the larger mythological terms of *utopia* and *domination*. When technology exhibited clear divisions, was easily distinguishable from the boundaries of the body, and could be decisively analysed in terms of its generative relationship to questions of class, race, and gender, that is, when the question of technology staked its claim to power on a world with unbroken borders, it was appropriate to inscribe technology within literary traditions pronouncing in favour of utopia or apocalypse. Thus, understanding technology could be framed in all its mythic intensity and implacable planetary drive using the imaginary spectres of Mary Shelley's *Frankenstein* or the essentially religious story of technology as human salvation that was Teilhard de Chardin's *Noosphere*.

In the digital age of intelligent machines, the question of technology becomes a much more complex story concerning the infiltration of seemingly every aspect of human and non-human life by the digital code. In a way never really anticipated by even the most dystopian or, for that matter, utopian of techno-visionaries, boundaries among machines, humans, animals, and inanimate nature have broken down, perhaps forever. For example, consider the fate of the body in the digital age. We have long been accustomed to thinking of the human body as something that is self-contained and relatively independent of its technological prostheses. In his most utopian moments, McLuhan could declaim that electronic technologies of communication represented 'extensions' of the human nervous system, just before, that is, his self-avowed sense of Catholic melancholy forced him to lament what he saw as human passivity in the face of technologies performing violent 'psychic surgery' on the human sensorium. Although McLuhan's affirmation of technology as a helpful extension of the human nervous system has continued to this day in increasingly triumphant announcements of the coming of the age of 'augmented media,' it should be noted that McLuhan's deeply felt ambivalence regarding the fate of technology, whether it result in a vast extension or a cataclysmic implosion of the human body, introduced a truly ambivalent sense of complexity into the story of technology. Now

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that we live after McLuhan, now that the media analysis so appropriate to the era of electronic technologies of communication has been eclipsed by the codework so necessary to digital reality, now that the supposedly externalized world of technological prostheses have actually invaded the human body, what might be called *McLuhan's doubt* – his prescient sense that technology contained a paradoxical story of augmentation and diminution – has amplified in importance, becoming the basis of a new way of understanding the real world of digital technology. Like a chain of thought that remains unbroken, McLuhan's doubt has created a new generation of digital thinkers who have succeeded in transforming his initial doubt about the ends of technology into a compelling story of digital complexity.

### Digital Complexity

In computationally intense culture such as Canada, the USA, other western but also Asian cultures like Japan, machine-to-machine communication has now progressed to the point where it's about 99% of all coded traffic. Most of that traffic takes place outside human awareness. Consequently, human awareness is the tiny tip of the pyramid of a huge amount of data flow, most of which happens between machines. There is a very unsettling aspect to this, revealed, for example, in the United States by President Bush's surveillance policy. However, that is only one small part of what is happening. The fact is that nobody knows the contents of these machine-to-machine communications, not even the National Security Agency. This gives one pause. It raises profound questions about the proper relation of human communication to all of these coded transmissions.<sup>3</sup>

Complexity is the essence of digital technology. In a culture of coded transmissions, diminished human awareness, and the entanglement of machines, humans, and animals in larger data flows that are often outside the range of traditional ways of understanding, the old (technological) world of automatic opposites has suddenly dissolved into complex fractures: those subtle, difficult to detect yet alone analyse, *fold*s wherein we have literally become digital bodies, with our eyes wide open to the wonders and dangers of wired culture. In the twenty-first century, complexity is what is unique about critical digital studies.

First applied to the problem of understanding technology in the writings of Katherine Hayles, a contemporary theorist of the 'regime of computation,' the concept of complexity has spread around the digital world at light-speed. That such a wide diversity of thinkers interested in the future of technology – artificial intelligence (AI) researchers, technovisionaries, communication experts, software programmers, new media artists, digital designers, web creators, and gaming innovators – immediately recognized in complexity theory something very familiar, indeed something reflective of their own experience of digital reality, implies that with the concept of complexity we are in the presence of a paradigm shift in interpreting technology.

This makes sense in two quite different ways. First, as expressed by Hayles in her books – *My Mother Was a Computer, How We Became Posthuman*, and *Writing Machines* – complexity intimates that the regime of computation with its complex models of simulation is capable of generating 'reality' itself, as well as providing powerful metaphors by which we have come to understand the increasingly computational culture within which we live. Digital technology ceases to be merely representational of the world, but becomes instead an emergent reality principle in its own right, driving culture and society forward by ever-proliferating digital innovations while, at the same time, providing compelling new ways of thinking about the digital reality that surrounds us. With Hayles, McLuhan's 'global village' actually comes inside us, transforming each of us into a navigator of the digital storm. And navigate we must because the regime of computation is beautifully complex.

Unlike previous historical eras in which we could with some authenticity maintain a safe distance from the question of technology, we all now have a *technological autobiography*. From the moment of our medically enabled births to our inevitable deaths in increasingly high-tech intensive care units, from a lifetime of computer-assisted education to digitally enhanced workplace experience, from the mass data archives that literally 'bank' human memory to the screens and spools and keystrokes composing the materiality of the regime of computation, the question of individual autobiography has become deeply entangled with the 'companion species' of technology. This entanglement is most apparent, of course, in the end products of technology, in those widely debated public policy issues that emerge directly from the planetary drive to the fully realized technological society – the crisis of global warming; the global economic creativity released by the 'flat world' of digital communication;<sup>4</sup> the ambivalent legacy of the science of genomics; the impact of digital technology in simultaneously concentrating immense conglomerations of corporate ownership while providing multiple opportunities for an 'open architecture' of information flows. What is more subtle, and more complex, however, is that we are also deeply entangled in the algorithmic currents of digital reality. Outside of normal human awareness, our consciousness, language, dreams, conjectures, gestures – the most familiar ways we communicate with and relate to each other – are being powerfully shaped and influenced by the 'machine-to-machine' data flows within which we circulate, and on account of which our lives are often enhanced, and sometimes disabled.

Waking up to the shock of the new, until now we have not had an adequate vocabulary by which to begin to articulate the full dimensions of the digital culture that surrounds us. But we do know this. If science and the humanities and, by extension, the natural and social sciences, remain in isolation from one another, it is critical human consciousness itself that will be lost in the cracks of the digital. Quite explicitly, if our lives are to be 'streamed' by the new sciences of computation, if individual autobiography is to be pushed and pulled by the strange loops, fast data flows, and complicated mediations of this epochal meeting of computation and flesh, then there

is a desperate requirement to do something that is as ancient as it is futurist: to find the 'words' by which to make familiar to our senses the new home of digital technology within which we have staked our identities, both individually and collectively.

Finding the 'words,' creating a new imaginative vocabulary by which to attune ourselves to the question of the digital is what complexity theory is all about. Not particularly romantic, complexity theory refuses to have anything to do with the quasi-religious theories now in circulation that elevate technology to a singularity moment. There is nothing transcendental about the question of complexity. How could there be? When boundaries dissolve, when crossing border lines is more natural than continuing to live in the solitudes of science and the humanities, then *being complex* requires us to consider precisely how the 'regime of computation' intermediates with very traditional questions of class, gender, race, ethnicity, and sexuality.

Moreover, we must consider anew the real *material* history of digital technology: software as ideology, the 'intermediation' of print and digitality, the global media apparatus as a 'vision machine,' and the reality studio as a 'simulacrum.' If digital reality has literally come alive in our technologically enhanced bodies, our computer-enabled economy, and our graphically intensified high-definition screens, then we might well want to begin to probe the new rules of communication by which the to date deeply divided 'companion species' of machines, humans, animals, inanimate nature, and future AI replicants, clones, and zombies can finally become acquainted with a growing sense of dynamic harmony. When cyborgs become, as Donna Haraway has brilliantly argued, a 'companion species' to the human, *being complex* assumes a larger importance as a basic strategy of cultural survival: 'Cyborgs and companion species each bring together the human and the non-human, the organic and the technological, carbon and silicon, freedom and structure, history and myth, the rich and the poor, the state and the subject, diversity and depletion, modernity and postmodernity, and nature and culture in unexpected ways. Besides, neither a cyborg nor a companion species pleases the pure of heart who long for better protected species boundaries and sterilization of category deviants.'<sup>5</sup>

If the technology of fire lit up the darkness of the night, if electricity illuminated the sky, and the power of words finally provided the human imagination with the means to communicate its innermost visions, then *being complex* does something different. Complexity allows us to communicate consciously in a culture where technology now inhabits the space-time fabric itself. Complexity compels us to be sensitive to the much-neglected fact that although the seasons of life (with its air, fire, water, and earth) have not gone away, the material history of the planet is only now beginning a new dialogue with the new realities of digital culture. We remain as yet unaware of what the results of that dialogue might eventually be. However, this one certainty drives us forward: only by learning how to be (digitally) complex will we hominids be capable of joining in this greater dialogue with a technology that will not be stopped and a nature that will not be long denied. Following Haraway, who has

argued long and eloquently for changing the 'narrative line' of science from fantasies of self-birthing and self-generation, and Hayles, who has made of us all potentially creative 'writing machines' in the midst of the digital maelstrom, should we not finally honour the question of technology by making of it an opportunity for appreciating the complexity of the digital reality that is our present and our future, and perhaps already even our unknown past? Should we not respond then to the question of technology with a search for a method by which to make of that question a guide to the future of digital complexity?

### Approaches to Critical Digital Studies

Critical digital studies represents a search for a new method of understanding the digital future. Confronted with the challenge of translating the concept of complexity into a new way of seeing digital reality, critical digital studies does not begin with an established agenda, but with an innovative series of questions. Here, the working premise is that the most important aspect of a search for a new method of understanding is the immediate challenge of posing the right question(s). Consequently, guided by four interpretive rules, critical digital studies sets out to ask four questions of the question of (digital) technology. First, how can we expand the scope of studying the digital future to include the full array of technological innovations, namely, the impact of digital technology on culture, society, economy, and politics? Second, how can we best interpret the fluid world of media archeology, those innovative media convergences that drive together traditional media (print, television, radio) with their digital counterparts from the Internet and the Web? Third, how can critical digital studies break beyond the disciplinary boundaries of traditional media interpretation to actually cross boundaries – boundaries of knowledge, of societies, of species, of machine-human interfaces – in search of a form of media practice that is itself reflective of the porous boundaries of the digital reality that it seeks to explore? And, fourth, how can critical digital studies achieve its desired aim of bending the digital future in the direction of creative uncertainty, that is, privileging the intermediations, inflections, and paradoxes that are so deeply characteristic of the digital flow? Not a prescriptive agenda, critical digital studies rises to the task of answering the question of technology with a series of complex questions of its own. It must do this because what is most interesting about the digital future is that its full dimensions remain unknown, its fate uncertain, its strategies unexplored, and its lasting consequences unanticipated. Today more than ever, it is surely time to ask some serious, creative questions of the enigmatic silence surrounding the question of technology.

This is precisely what *Critical Digital Studies* sets out to do. In keeping with the spirit of complexity, it focuses on four key contemporary intersections of the digital future: code breakers, technology, politics, and culture.

## Code Breakers

What is truly *critical* about critical digital studies is the emphasis on not only understanding the dominant codes of technology, politics, and culture in the digital era, but also on digital studies that excel in breaking the codes and in introducing new visions of the digital future by disrupting the codes, disturbing boundaries, and adding uncertainty to established patterns of (code) behaviour. Each contribution to *Critical Digital Studies* has this double quality about it – namely, studying what Haraway has described as the ‘informatics of domination’ only in order to write possible new codes for the ways in which we do politics and gender and bodies and communication in the future. The creative act of code breaking reaches its apogee, however, in the writings of N. Katherine Hayles, Donna Haraway, Sara Diamond, and Lynn Hershman Leeson. Understood individually, these four introductory chapters bring to the surface of critical thought the deeper codes of information, gender, design, and bodies so characteristic of the supercharged environment of technological society. Understood collectively, these contributions represent something very different, not so much critical studies of digital experience, but profound, even foundational, efforts to make of the act of digital code breaking a new way of understanding technology.

Hayles, in ‘Traumas of Code’ (chapter 1), explores the double-edged benefits (and dangers) of code as the ‘unconscious of language.’ For Hayles, we are living now in the dense web of the ‘technological non-conscious.’ Both a powerful enabler and potential danger, code as the technological non-conscious implies for Hayles ‘the dual promise and threat that intelligent machines pose to the uniquely human capacity to create meaning through language.’ But, of course, when code becomes language to the extent that we can now speak about a ‘technological non-conscious,’ this also means that questions of (digital) trauma cannot be far behind. In transferring control of human communications to intelligent machines, have we not also invested the age of intelligent machines with our hopes and desires, our fears and anxieties, our vulnerabilities and resentments?

If this is the case, then the other field-defining chapters in ‘Code Breakers,’ the first part of this book, can be viewed as brilliant recommendations concerning how best to work through the *trauma* of the technological unconscious. In ‘A Game of Cat’s Cradle: Sign Studies, Feminist Theory, Cultural Studies’ (chapter 2) Haraway argues that if we are not to be sucked into the ‘gravity well of technoscience’ we had better learn quickly how to *reconfigure* – ‘how to trope and how to knot together key discourses about technoscience.’ Setting up a game of cat’s cradle for the social sciences and humanities, Haraway follows her own advice by literally ‘reconfiguring’ the language of technoscience with urgent questions focused on gender, sexuality, colonialism, and class, representing in all of their latent power and immediate vulnerability the *critical consciousness* of science studies, feminist theory, and cultural studies. Although written at different moments and certainly with different intentions, it is almost as if Haraway’s game of cat’s cradle constitutes an immediate response to Hayles’s plea for a form of critical

digital consciousness that would finally take account of the fact that code is not simply the operating language of intelligent machines but perhaps something more disturbing, a counter-unconscious – a ‘technological unconscious’ – paralleling in its mystery the still unknown realm of the human unconscious.

Writing from a cross-cultural perspective, Sara Diamond surveys the brilliant contributions of Chinese, Japanese, African, Latin American, and (North American) indigenous new media artists to understanding the futures of digital complexity. In ‘Reframing the Cathedral: Opening the Sources of Technologies and Cultural Assumptions’ (chapter 3) Diamond explores the question of the technological unconscious at the level of digital design. Here, the traditional languages of new media authoring tools, from Hypertext and MIDI to gaming software, are supplemented with the creative visions of new media designers from the multiplicity of cultures and nations and traditions and even continents normally ignored by the informatics of (design) domination. Refusing to believe that the world of new media design is flat, Diamond’s perspective resonates with images of difference: Japanese aesthetics with its bias towards beauty including ‘incompletions and imperfections’; west coast indigenous art with its (virtual) visions of the sacred; and Chinese new media representations of ancient traditions of anime and calligraphy. With this, Diamond does that which is most difficult, but ultimately most rewarding, namely, illuminating digital vision with those creative expressions of the human mind that seemingly have become lost with the triumph of the language of technoscience. Maintaining that the ‘visual aesthetics of tools tend towards binary, linear, rectangular aesthetics,’ she argues on behalf of a different design vision, one advanced by cultures that embrace ‘complexity, discontinuity and asymmetry as organizing principles’: ‘This is a delicate negotiation – the recognition of cultures that have maintained a continuity with a natural science that speaks to dimensions beyond four, that sees time as a navigable object, that uses circular forms and narratives in which scientists close their eyes and imagine models beyond our perception, of a space perhaps linked to ritual, prayer rugs, and mosaics. This pace of invention, of imagination, is a space shared by art, non-Western mathematics, and science. It is as science surrounded by our imaginings of Nature, West and East, North and South’ (65).

Working independently, renowned California new media artist Lynn Hershman Leeson intensifies Diamond’s evocative insights related to possible new languages of digital design by actually reframing the cathedral of her own (digital) body. Hershman Leeson’s new media creations (film, video, writing) have achieved such global acclaim because she is a world leader in exploring the *rematerialization* of the body in cyberspace. Understanding digital culture as a fluid, liquid space of networked relations that increasingly circulate around and through the bodies of its inhabitants, Hershman Leeson asks unsettling questions not only about the fate of the electronic body, but also about the once and future shape of human identity: ‘Identity is the first thing you create when you log on to a computer service. By defining yourself in some way,

whether it is through your name, a personal profile, an icon, or mask, you also define your audience, space, and territory. In the architecture of networks, geography shifts as readily as time. Communities are defined by software and hardware access. Anatomy can be readily constituted' (71).

For Hershman Leeson, masking through computer-mediated communication has immediate consequences:

Not only do you not need a body, but entering cyberspace encourages a disembodied body language. Posing and emoting are some of the terms for phantom gestures that can be read through words, or seen in special video programs through simple movements such as waves. Codes of gestures can be read by attachments on the computer that articulates hidden meanings of voiceless and mute speech.

Actions are constantly under surveillance, tracked, traced, digitized and stored. Icons such as masks are of particular importance because the disguises used today may determine an archetype of the present that will eventually reflect the ephemeral nature of a society geared towards images of manipulation and self recreation (71).

Not satisfied with exploring the real-time art by which we have actually masked our (electronic) bodies as we communicate within and across the spaces of YouTube, Google, and the Web, Hershman Leeson goes beyond the language of (cyber) bodies and masks to an impressive exploration of all the 'non-bodies' and 'anti-bodies' that await the unfolding of the digital future. Less focused on machine crashes than crashes of the human body under the pressure of information flows, Hershman Leeson investigates what it means to locate ourselves in the found environments and virtual spaces of digital culture. Like an artistic avatar of massive online role-playing games, her work explores the transformed landscape of identity at that point where we willingly become an 'objectified non-bodied alternative personality.' And her concerns are not simply with the world of gaming. For Hershman Leeson, what happens now in digital reality has long been prefigured by mass media with its violent image-based transformation of the last remnants of real bodies into a strange new world of 'phantom limbs, interactivity, and disappearances.' About this, her perspective is explicit: 'These each articulate references to the mutation of the female body through the seduction of media. Reproductive technological parts sprout from the image of the female, creating a cyborgian reformation as parts of the real body disappear' (79).

At stake in Hershman Leeson's perspective is this basic code breaker of a thought, namely, are we witnessing today the 'birth of the anti-body,' our Net identities as increasingly fictional personas who 'in reaction to an unhealthy natural environment ... reject what exists, and in order to survive, form another environment': 'This Inter-netted, plugged-in anti-body is a transitory construction of time, circumstances, and technology, a newly issued prescription of earlier impulses. She has chosen to negate

the selfhood in which she was born. Instead she shows a marked preference for the artifice of technology' (82).

A futurist by practice but very much a student of more enduring patterns of culture by temperament, Hershman Leeson has a vision of bodies, non-bodies, and anti-bodies that returns us to something we thought we had finally surpassed at the speed of digital culture – the Faustian bargain involved in the question of technology. Or, as she concludes: 'If humans have become the interface to the larger communicative body, can soulful automatons be far behind?' (84).

### Technology, Identity, and Surveillance

The verdict is still out on the future of technology and culture. While perhaps neither a perfect utopia nor a fearful dystopia, one thing is certain. Contemporary society is increasingly stressed out by accelerating rates of technological change. Confronted with the blast of technology moving at light-speed, the human nervous system seems, in the first instance, to have either gone numb for survival, adapted itself passively and fatalistically to the digital juggernaut, or become lost in a culture of (digital) distractions. Today email is clogged with spam. Electronic spyware is capable of tracking our every move on the Internet. Complex computer systems, whether in business or government, can suddenly be disabled by always mutating viruses. No sooner have individuals become accustomed to the wired world of personal computers, CD players, and VCRs than digital technology itself suddenly evolves in the direction of the wireless future of iPods, cell video phones, radio-frequency identification (RFID) tracking chips, and a dense, creative matrix of new forms of digital communications spear-headed by blogs and podcasting.

When everyday life comes to mean *digitally mediated* experience, serious consequences follow for individuals and societies remaining unaware of the rate and direction of technological change. Indeed, over and beyond the rapid digital change that we can see on the surface, what may now be occurring as a result of massive technological transformations of the basic structures of culture, politics, and economics is a gigantic shift of the deepest fault lines of society where the only constant is that the world as we know it today is unlikely to persist, even into the near future. Understanding technological complexity is a key survival strategy in the twenty-first century.

Focusing on key approaches to understanding real-time technology, the chapters in the second part of this book, 'Technology, Identity, and Surveillance' explore the data archive, showing in detail what happens to human vision, identity, consciousness, power, and perception as society and culture are increasingly wrapped in the digital membrane. Beginning with the tacit assumption that the new world of digital media, images, and networking is no longer understandable in forms of media analysis relevant to electronic mass media such as television and radio, the contributions about real-time technology actually create a basic vocabulary for understanding new digital realities

such as 'tracking,' 'armed perception,' 'meta-tags,' 'precogs,' and 'hyperviruses.' With astonishing speed, events that until not long ago were the subject of science fiction now have technologies of visualization, surveillance, gaming, and viral (computer) crashes. It is as if a violent (digital) shudder has suddenly passed through the framework of reality itself, instantly exposing us to a new digital reality with its space-time fabric moving at the speed of light. We are accelerating at escape velocity in the light through space and light through time of the digital blast anxiously seeking new concepts and visions by which to make sense of the contemporary human predicament. To the complexity of the digital reality that is their subject matter, the contributors to 'Technology, Identity, and Surveillance' respond with intense, complex thought – boundary-crossing, fluid, bifurcated, and often paradoxical.

Bringing together some of the leading international scholars in new media analysis – Jordan Crandall, Lev Manovich, Alexander R. Galloway, Nate Burgos, Eugene Thacker, and Thierry Bardini – a fundamentally new approach to understanding new media is articulated in all its internal coherence, intellectual diversity, and media relevance. Here the emphasis is placed on a slow, patient, in-depth reading of the borderland between digital media, identity, and perception.

Counterposing seeing (or visualizing) versus tracking (or calculating), Jordan Crandall explores what happens to human vision and consciousness when the media apparatus becomes a vast tracking mechanism, capable of very real precision in mapping bodies in their (electronic) movements, transactions, and (archived) memories. Refusing to approach precision tracking technologies as something safely outside human identity, Crandall does something more intellectually risky, but ultimately amazingly rewarding. He demonstrates how the digital body has now become complicit in precision tracking technologies, sometimes as a voyeur of its own digital travels, at other points numbered into submission by the ubiquity of 'Precision + Guided + Seeing.'

In 'Understanding Meta-media,' Lev Manovich extends new media analysis to its next logical step, exploring the meta-media paradigm that is at the centre of contemporary computer culture (software interfaces, hypertext, downloads). Taking seriously Katherine Hayles's narrative of the 'regime of computation,' Manovich argues that meta-media as a way of understanding real-time technology have become the dominant sign of network culture, replacing the older, more conservative notion of media culture proper. The argument has to do with the capacity of meta-media to extrude, extend, link, and expand both the media they engage with as well as the environment in which these engagements occur. In a media scene where the borderlines among traditional (mass) media and new (digital) media have imploded, Manovich's media analysis is like an early warning system, alerting us to a profound paradigm shift in the deep framework of contemporary media.

Focusing on *Warcraft*, the very popular massively multiplayer online role-playing game (MMORPG), Alexander R. Galloway's 'Warcraft and Utopia' examines the fateful consequences that follow from a meta-media culture of precision tracking technologies.

Again, like Crandall and Manovich, Galloway refuses to think of the question of digital utopia/dystopia in conventional binary terms; he redefines the meaning of utopia in a network culture by discussing in detail the positive and negative aspects of considering video games as forms of utopia. Here the mandate for imagining life before or after capitalism becomes a challenge of imagining life *within* a networked capitalist world, with its complex interplay of coding, decoding, and recoding.

That the digital future can only be explored from within the parameters of a networked capitalist world is the common thread linking the following three contributions: 'The Age of Blur and Technology' by Nate Burgos, 'Biophilosophy for the 21st Century' by Eugene Thacker, and 'Hypervirus: A Clinical Report' by Thierry Bardini. Written by digital scholars who have thought deeply about issues related to digital complexity, these chapters rub closely against the major currents of power, language, and technology in the present epoch. If Burgos can articulate so well how the politics of 'pre-emptive deterrence' has seemingly shifted in a nanosecond from the subject-matter of Hollywood sci-fi blockbusters to omnipresent technologies of contemporary anti-terrorist policing, it is probably due to his acute understanding of real-time technology as equivalent to the 'age of blur.' From projection to prediction, eyes wide open, scanning possibilities and making precognitive representations as a strategy for dealing with the intensifying visual pace, *being precog* has become as 'natural' to us as human vision itself. No time for understanding, fast forward, rewind, and make your predictions before it is too late: the 'age of blur' is a mandate for a pre-emptive human imagination.

Not only the creation of a pre-emptive human imagination as part of the cultural fall-out of digital culture, but perhaps now even life itself is becoming rapidly destabilized by that powerful conjuncture of high-speed computer sequencing and genomic biology that we have come to know as the 'biotech century.' Thacker's contribution is itself pre-emptive in drawing some hard conclusions from the seeming triumph of digital technology. For Thacker, the interface of computers and biology has transformed the concept of life itself, bringing life within the purview of bioengineering, performance, representation, and simulation. With this, classical distinctions between flesh and machines dissolve, and we find ourselves within a new borderless zone, a new body future, desperately in need of a way of articulating issues related to multiplicity, contingency, and dynamism that are the elementary matter of biopower today. If the language of biology works in conjunction with software coding to produce the biophilosophies guiding the construction of the bodies of tomorrow, then this lends great urgency to Thacker's project of pre-emptively understanding the bioaccidents towards which we are accelerating, without much in the way of public reflection.

Equally, the theme of the virus is central to the question of the digital future, as is the communicability of the virus in growing social, cultural, and political contagions. Bardini explores the 'virus' as the master trope of contemporary society. Beginning with the main thesis that understanding the viral contagions of culture and society

does not exempt one from their impact, Bardini maintains that we think about the virus today from an already virally infected (socially, culturally, and politically) position. Historically situating his analysis in an exploration of the four medical tropes symptomatic of the different phases of capitalism – plague, tuberculosis, cancer, and virus – Bardini offers some creative insights concerning those viral contagions such as terrorism, AIDS, epidemics, and perhaps information itself that both infect and deflect twenty-first century society. Is it possible that Bardini's account of the virus as the master trope of contemporary culture is the real 'meta-media' within which the digital future will unfold?

### Politics, Gender, and Religion

In the culture of real-time globalization will the digital future be open or closed?

We know for certain that an open digital future is surging everywhere on the Net. Consider newly emergent technologies such as blogging, shareware, Wikipedia, mash-ups, and Web 2.0, all of which have the potential to transform digital reality in the direction of greater human innovation, creativity, and individuality. To the question of whether digital culture will be effectively captured and privatized by powerful multinational corporations whose agenda necessarily reflects only their own proprietary interests, the answer can only be ambivalent. Politically, the issue is as yet undecided. While blogging, with its multiplicity of self-confessions, on-line diaries, and deeply courageous independent journalism giving witness to political cruelties in many countries of the world, may seem to reflect the movement online of humanity in all its varieties, it has also changed *how* the future is envisioned, communicated, and contested. Although official power – governmental and corporate – may consider the script of digital communication to be running on automatic, blogging is like that beautiful error in the software program, a technological innovation that potentially makes of every digital citizen the creative interpreter of her own narrative construction. Precisely because it is a massive global phenomenon with an always open future – variously democratic, polemical, reasoned, demagogic, critical, and conservative – blogging represents a radical transformation in the actual relations of communication surrounding the democratic future. Consequently, to the question Will the digital future be open or closed? the answer is probably *neither*, the greater truth residing in a careful study of the complexity that is the world of politics, gender, and religion.

Indeed, digital politics cannot be adequately analysed outside its relation to the dramatic issues surrounding the interplay of religion, terrorism, and ideology at present. Even the most cursory reading of daily newspapers or the briefest exposures to the 24/7 news cycle of mass media provides an instant snapshot of the turbulent nature of digital politics. On a global scale, struggles over power have increasingly migrated online: witness both the vast expenditures by governments in creating complex surveillance systems (data mining electronic archives, chat rooms, cell phones,

bank records, Internet service providers), and the increasingly creative ways in which the otherwise scattered forces arrayed against such governments have utilized online resources for communication, organization, and planning. Equally, the spectre of terrorism haunts the media scene, with government-issued allegations of possible terrorist attacks competing with al-Qaeda's own production of cinematic trailers in the form of regularly updated warnings of terrorist threats. To the viral terrorism of political forces resisting the Western agenda of globalization, the state today has responded with its own strategies of media terrorism.

The unfolding complexity that is digital politics today is captured in all of its diversity and violence by the contributors to part three of this book, 'Politics, Gender, and Religion.' For example, James Tully's essay, 'Communication and Imperialism' (chapter 13) sets the stage for the discussion of digital politics by arguing that a new form of insurgent imperialism is the driving force behind the communicative technologies of networked culture. For Tully, the language of imperialism frames the how, why, what, when, and where of the politics of communication – sometimes overtly in terms of the staging of media spectacles, and at other points much more subtly by way of the proprietary design of the communication apparatus itself. While very real strategies of imperialism may have interpolated the structure of communication, the media scene is always seduced by the spectacle of terrorism. This is why Michael Dartnell, in 'Grammar of Terrorism: Captivity, Media, and the Critique of Biopolitics' (chapter 15) can argue so convincingly that 'hostage narratives' are now the essence of digital politics. Although not particularly new – hostage narratives, for example, are a crucial locus of American political history – the media figure of hostages is fundamental to the grammar of terrorism. Noting that all politics today is 'biopolitics,' Dartnell deploys the trope of hostage narratives as a way of deconstructing the media story of power and captivity. It's quite the opposite with Stephen Pfohl's 'Technologies of the Apocalypse: The *Left Behind* Novels and Flight from the Flesh' (chapter 22), which examines the massive popularity of the *Left Behind* series of novels (sixty-two million copies sold to date) in the United States. Here the focus is on 'rapture' not captivity, with the *Left Behind* novels telling the dramatic story of an epochal struggle waged between Christians and the dark forces of the anti-Christ in the twenty-first century. For Pfohl, the popularity of the technologically astute *Left Behind* series provides a privileged glimpse of the forms of popular subjectivity supporting contemporary neoconservative politics. The series also provides an opening for a series of critical observations on the rise of religious rapture as the capstone of neoconservative politics, with its dark eschatology and visions of (political) apocalypse. Complementing Dartnell's 'captivity narratives' and Pfohl's analysis of technologies of rapture, three other chapters undertake critical studies of the real world of digital politics: 'The Passion of the Social,' by Andrew Wernick explores the grisly reality of nihilistic violence in advanced technological societies; 'Digital Cosmologies: Religion, Technology, and Ideology,' by Arthur Kroker develops an important political thesis, namely, one that predicts that the

digital future will increasingly play itself out as a global crisis of clashing perspectives – born-again ideology and the informatics of (digital) hegemony; and Daniel White’s ‘Terri Schiavo: Bride of Compassionate Conservatism,’ inscribes in words the seduction and perils of the politics of compassionate conservatism viewed from the Atlantic coastline of Florida.

That we are living now in the detritus of digital politics with all of its unfinished borders among religion, terrorism, and ideology is powerfully reinforced in ‘Politics, Gender, and Religion’ by other contributors, their choice of topics betraying a very material sense of urgency. The subject-matter of these chapters serves as a haunting talisman leading *Critical Digital Studies* into the raw materiality of contemporary political struggles. With ‘Tell Us What’s Going to Happen: Information Feeds to the War on Terror,’ by Samuel Nunn, ‘Infomobility and Technics: Some Travel Notes,’ by Belinda Barnet, ‘21st Century Graffiti: Detroit Tagging,’ by Jeff Rice, and ‘When Taste Politics Meet Terror: The Critical Art Ensemble on Trial,’ by Joan Hawkins, we are suddenly thrust into the violent storm-centre of digital politics. Sensitive to the subtle modalities of lived politics, refusing easy polemics, always capable of drawing the focal insight from the web of intersecting political events, these chapters ride the cutting edge of digital politics. Creating new analytical terms to describe a complex political circumstance that is *still* dynamically evolving, these contributions put the reader in the vortex of the political storm: thus the reader is *becoming* an information-feed to the war on terror, *exposing* the ‘policing [of] the convergence,’ *experiencing* anew the bitter frustration of ‘taste politics’ meeting the dark angel of terror.

That the broken boundaries and disturbed borders so characteristic of digital culture have given rise to a new form of digital studies – one sensitive to the impact of technology on gender and on the human body – is demonstrated by Jaimie Smith-Windsor, in ‘The Cyborg Mother: A Breached Boundary’ (chapter 17). In this technological autobiography, Smith-Windsor explores the ambivalent relationship between machines and humans, asking explicitly if after sixty-nine days in an incubator her baby daughter has become a cyborg – a being caught up in a deadly race between bodily health and technological overdependency. Writing as a mother, a theorist, and a feminist poet, Smith-Windsor pioneers another way of speaking about technology: a form of writing not from the outside of digital reality, but literally from within the complex mediation of life-giving incubation and maternal life that is, with all its ambiguities, the balance on which her baby’s life is suspended. This reflection on technological complexity is taken one step further by Mary Bryson, Lori MacIntosh, Sharalyn Jordan, and Hui-Ling Lin, in ‘Virtually Queer? Homing Devices, Mobility, and Un/Belongings.’ On the surface this is a strikingly original, ground-breaking study of the relationship of lesbian and gay sexuality to network culture; however, the essay no sooner begins its exploration of being lesbian and being gay, which is to say begins to queer digital culture, than it opens onto a more general reflection on the question of technology. With a deft touch, ‘Virtually Queer?’ asks in effect whether the real world

of digital technology does not have about it a curious sense of mobility and un/belongings, homing devices, and estrangement. Could the human condition of being ‘virtually queer’ represent something larger than its sexual register – being digital as always living between the edges of obsolescence and transformation, networked connectivity, and personal isolation? If this is the case, then is all digital politics necessarily a complex mixture of the personal and the public – a search not only for the ethical ends of technology but also for an ethical account of oneself?

### Culture, Communication, and Media

*Critical Digital Studies* approaches real-time culture with acute sensitivity to the impact of digital technology on human subjectivity. *Thinking digitally* implies the creation of a form of writing in which technology is interiorized with such intensity that thought itself begins to illuminate the digital future from the inside. In the age of mechanical technology, writing could still be from the outside, hovering around the edges of industrial technology in order to assess its consequences for patterns of social and cultural development. Even in the era of electronic technologies of communication, studies of technology permitted themselves the luxury of believing that thought itself was representational, still at one critical remove from the (technological) object of its investigation. No such illusions are possible in digital culture. When digital technology wraps itself around the human sensorium, when the human nervous system is invaded by software codes, when the ‘soft’ matter of perception, imagination, and vision are worked over seductively and violently by the digital reality machine, then writing itself must become digital approximating in its gestures, methods, and speed the (digital) reality principle that it wishes to explore.

Thinking digitally is the essence of the contributions to the last part of this book, ‘Culture, Communication, and Media.’ In ‘The Rebirth of the Author,’ Nicholas Rombes discusses information society in terms of its *enhanced* cultural possibilities. In a world of political control and technological surveillance, the ruptures (‘mistakes, errors, slippages, ambiguities, reversals, contradictions, irrationalities, and surprises’) in the system allow for the resurgence of humanity, and enable an exciting future of proliferating authorship. For Rombes, digital culture facilitates freedom to voice one’s position in the increasingly popular (and populist) world of iPods, blogcasts, web design, and instant messaging. Equally important is the cultural impact of digital technology in creating space for a new ‘anti-aesthetic’ possibility, as illustrated, for example, by the global success of Dogma films and other indie rough cuts. However hard powerful network corporations try to smooth out the world of digital disturbances, hyper-individualism, and other inflections of digital space, ruptures – mistakes, slippages, surprises, errors, and contradictions – are, and will continue to be, a continuing part of digital logic. The age of passive media audiences interacting on a one-way track with content producers has given way now to a creative proliferation of authorship – with unpredictable consequences.

Julian Jonker illustrates this in 'Black Secret Technology (The Whitey on the Moon Dub)' (chapter 34). Through the autobiographical lens of a Black South African growing up with science fiction, comics, hip-hop, and cyberpunk, the essay reinforces the ideological implications of technological living, both on the imagination itself and on the politics of race, class, and culture. Gravitating towards the ways in which living with technology (and growing up technological) provokes new and alternative ways of engaging with the world, Jonker examines how politics and the imagination are shaped by personal experiences with a digital world, and how individual intervention in standardized patterns of technological use can be transformed into new spaces of resistance, new ideological patterns, and new imaginative 'homes.' Like Rombes's 'ruptures' as a gateway to the proliferation of authorship, Jonker thinks digitally as a way of describing the emerging contours of a 'politics of the imagination.' Here, science fiction is retranslated as a 'paraliterature' – an allegory for cultural difference – and the 'street finds its own use for things' outside the original intentions of (corporate) digital designers.

It is not just 'the street' that finds its use for things, but digital artists as well. Stelarc, the internationally renowned performance artist, has taken the project of thinking digitally to its next stage: being digital. Viewing the prosthetic head as a kind of prosthetic consciousness – an 'administrative double' of sorts – Stelarc investigates how to understand consciousness in order to better 'communicate with computers.' If we are indeed living in the 'regime of computation,' then Stelarc's insights are not only visionary, but practical survival habits for a culture where intelligence itself is experienced now in the doubled form of the 'embodied' and the 'embedded.' Absorbing the reality of fast-paced technological change directly into his consciousness, Stelarc makes the powerful methodological point that, today, awareness is heightened by crises as intelligence moves from the (physically) embodied to the (AI) embedded. If 'uncertainty generates possibilities,' then we need new accounts of such strange technological paradoxes that are the new normal, such as 'disembodied embodiment,' the 'personalization' of AI, and the creative nuances of coded language. That Stelarc's vision of the 'Prosthetic Head' blurs boundaries between machines and (human) flesh is illustrated by Julie Clarke's eloquent response as she takes the opposite view that machines are 'not-human' and that the Prosthetic Head is embedded, but not embodied, and thus incapable of slipping away from its status as a prosthesis. What we have in this debate between Stelarc and Clarke is less different viewpoints on the consequences of an artist's vision of the Prosthetic Head than a major clash of perspectives on the nature of consciousness itself in the digital age. Has Stelarc's Prosthetic Head actually gone inside each of us as our 'administrative double' for the future – what software CEOs like to describe as 'digital assistants' – or is there still an unbroken border between embodied consciousness and its technological prosthetics? If we dissent from Stelarc's viewpoint concerning the transformation of embodied intelligence into 'extruded consciousness,' how can we be certain that this is not the form of digital thinking intended to make bearable the future of increasingly prosthetic minds?

After all, as William Bogard argues in 'Distraction and Digital Culture' (chapter 28), powerful forces are at work in digital technology that function to distract (human) intelligence from the challenge laid down by Stelarc to received, comfortable interpretations of embodied mind. Emphasizing the dynamic in which contemporary power (on both the individual and social levels) not only deploys distraction for purposes of control, but also fears losing control to other distractions, this chapter situates the phenomenon of distraction as central to specific negotiations of identity, art, the military, hyperreality, and technology. The assertion is ultimately that awareness of the various trajectories of distraction enables renewed insight into the polyphonic flows of contemporary living. In relationship to critical digital studies, this chapter is of substantial importance because it situates not only the question of the digital future on the ideological level, but also the negotiation of the cognitive consequences that follow from living in a distracted culture. Distraction is both a 'game of power' and a 'condition of survival.' If the triumph of the 'regime of computation' means that we have been launched at escape velocity into self-regulating chaotic systems, then distraction with its logic of 'escape and capture,' 'clutching and elusion,' is now the real world of thinking digitally.

#### Notes

- 1 For example, see wikileaks, available at <http://www.wikileaks.org>.
- 2 John Sutherland, 'For those about to Rock: We Turn on Our Cellphones for You,' *Guardian*, 7 Sept. 2005.
- 3 Katherine Hayles in conversation with Arthur Kroker, *CTheory Live* interview, 26 April 2006, available at <http://www.pactac.net/pactacweb/web-content/video44.html>.
- 4 Thomas Friedman, *The World Is Flat: A Brief History of the Twenty-first Century* (New York: Farrar, Straus and Giroux, 2005).
- 5 Donna Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness* (Chicago: Prickly Paradigm Press, 2003).