Bits of Life

An Introduction

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The title *Bits of Life* invokes a figuration that signifies today's cultural fusion of the biological and the technological. It also points to the current proliferation of different discourses on "life," indicating that there are many "bits" of life that we need to think through. This is a daunting task, given that life is so ancient and discourses on life are so changeable. In this book, the figuration "bits of life" is interpellated in order to allow us a critical distance from currently emerging discourses and practices that make "life" into an object of scientific, religious, and cultural attention and fascination. Discourses on life are, after all, entangled in gendered, racialized, and sexualized truth regimes, claiming to represent the final word of science or religion. These are saturated with power relations, which are structured in a complex, weblike manner that differs significantly from classical binary oppositions between the haves and the have nots.

The phrase "bits of life" means that we do not engage with "life" as a whole but with its many manifestations in art and popular culture, the humanities, and the sciences. It forces us to strike alliances across academic disciplines as well as across the "two cultures" of the arts and the sciences. The emphasis on life in contemporary culture also brings in the return of discourses and practices about the human body. In *Bits of Life*, we explore and evaluate the current reinvestment in the human body, a body that is full of life as well as disease and death, reconfigured by technology and bombarded by bits and bytes of information and experience.

Since World War II, the biological and the technological have fused and amalgamated in new ways. The third culture that, in the late 1950s, Snow (1993) envisaged for the future was closer than he perhaps imagined. In 1960, the notion of the cyborg (cybernetic organism) was coined as part of the evolution of the science of cybernetics and early space-flight research, predicting for the near future a radical redesign of bodies, which would make humans and animals fit for life in outer space

(Clynes and Kline 1995). The cyborg figure that later was remade as a prominent feminist figuration (Haraway 1991a, 1991b), suggested a material and semiotic dissolution of the boundaries between organism and machine. With the typical techno-optimist rhetoric of the 1960s, the famous science fiction writer Arthur C. Clarke (1964), one of the first to introduce the cyborg figure to a broader public, predicted that cyborgs would soon make the distinction between organism and technology obsolete. Deleuze and Guattari (1972, 1980) philosophically elaborated the point that there is no longer a clear distinction between ourselves and our technological environments. Instead, there are complicity, intimacy, and promiscuity between the given and the acquired, according to the "process ontology" introduced by the poststructuralist generation (Braidotti 2006).

The entanglement of the biological and the technological, of "man and machine," is in itself not new, but the sheer expansion and all-pervasiveness of that entanglement is quite staggering, as is the ever-accelerating speed at which the two have been merging in the last decades. The technological redesign and reconfiguration of bodies and environments becomes more and more a part of everyday life. Against this background, a rethinking of bodies as well as environments becomes a pressing issue for information science and the biological sciences. As life bits, whether carbon- or silicon-based, are transformed, the body threatens to fall apart into "components," to decompose down to its molecular structures, which can be reassembled in new and unexpected ways and remediated in endlessly changing shapes. The human body can no longer be figured either as a bounded entity or as a naturally given and distinct part of an unquestioned whole that is itself conceived as the "environment." The boundaries between bodies and their components are being blurred, together with those between bodies and larger ecosystems.

Moreover, related convergences, which also contribute to the blurring of boundaries between the biological and the technological, are forcefully being put on the agenda today. For example, the discourses of the info- and biosciences are becoming more markedly connected. Keller (2000: 127) notes that "the conceptual traffic between engineering and biological sciences . . . never [has] been heavier or more profitable." Other scholars argue that it is not possible or desirable to separate media, science, and technology. Kember (2005) writes that "new media forms are . . . increasingly in-formed by biology." The significance of biotechnology vis-à-vis media is underscored by Haraway (2000: 26), who is convinced that biology will supersede film or literature as one of the great "representing machines" of this century.

Our cultural "practices of looking" (Sturken and Cartwright 2001) are changing our perceptions of bodies, technologies, and ourselves. As Bolter and Grusin

(2000) argue, the logic of endless remediations of new multimedia creates a paradox of immediacy (that is, of the medium appearing to be a transparent window on the world) and hypermediacy (that is, of the medium foregrounding its form, breaking the illusion of immediate access to the real). This phenomenon contributes significantly to the blurring of boundaries between bodies and technologies. Mediated by a technologically enhanced gaze, bodily micro- and macroworlds, from cells to planets, are becoming an unquestioned part of our everyday life outlook.

The figure "bits of life" is grounded in this convergence between biogenetic sciences and regimes of visualization, pointing to the "emergent paradigm of biocultures."[1] The relation between biology and culture is not harmonious but conflictual. Our figuration assumes a posthuman definition of the body: a body that is not-one. While taking the fragmentation of the body-in-ruins from postmodernism, this collection of essays moves beyond the particular postmodernist economy of affect that has wavered between euphoria and nostalgia. *Bits of Life* assumes a more sober grounding of the questions surrounding the biocultures of today, which do not refer back either to humanist bodily integrity or to the anthropocentric assumption that human bodies are the only ones that matter. The centrality of "life itself" (Rose 2001) opens up the perennial discussion of how bios relates to culture, and the contributors to this volume address the different facets as well as the extent of the shift in relations between bioscience and culture today. Some pay more attention to the pole of bios; others interrogate the cultural realm.

Because technoscience and bioculture constitute a site of anxiety, in this book we sketch some conflictual or contradictory contours of biocultures, tracking the multiple power relations that circulate in their midst. It is quite striking how often certain boundary transgressions or new possibilities opened up by biotechnology are shut down or blocked. For example, in chapter 5, Amade M'charek and Grietje Keller show how new configurations of three-person "parenthood," enacted by in vitro fertilization (IVF) technologies, are erased by hegemonic notions of coupled heterosexual parenthood, and Celia Roberts, in chapter 4, argues that the interdependent ecosystems in which hormones are now seen to flow as "global fluids" are met by cultural messages about individualized consumers' responsibilities for preventing hormonal "exposure." The cultural imaginary also responds with anxious resistance to technoscientific transformations. In chapter 7, for example, Jackie Stacey analyzes the way in which "technologies of imitation," realized with new cloning techniques, are cinematically translated into the sexualized dangers of the masquerading female monster. And in chapter 9, Anneke Smelik reveals a similar cultural imaginary, which turns the technocultural matrix of cyberspace into what is,

once again, the familiar story of the flight from the body and the fear of and fascination with the (culturally denied) maternal womb.

If bioculture is indeed something new, it nevertheless does seem to have features that are all too familiar. From the repetition of those old stories we may even deduce certain cultural blockages that are uneasily coding the implications of bio/technoscientific changes. The question is whether cultural power relations necessarily change when bodies, memories, genetic identities, sperm and eggs, and hormones can be experienced and technodesigned in different ways. In these conservative times, we may tend to focus on the hegemonic cultural practices that try to contain the emergent possibilities of bio/infotechnologies. Yet, as José van Dijck (chapter 8) and Jenny Sundén (chapter 10) show, digital technologies also open up new stories and social changes. And Karen Barad (chapter 11) and Rosi Braidotti (chapter 12) opt for a more dynamic approach to understanding life as a mode of becoming.

In this book, then, the figuration "bits of life" is meant to be an evocative term that can help us map changes and transformations and strike a middle road between the metaphorical and the material. By invoking the figure "bits of life" against this background of a diversity of blurred boundaries and machinic assemblages, we hope to present an adequate and condensed feminist analysis of present-day technoscience and biocultures. *Bits of Life* captures a certain technophilic sensibility as one of the distinctive traits of feminist studies of media, biocultures, and technoscience. As we have seen, the body in its many material-semiotic modes and codes is (still) an important pivot. Feminist studies of digital media and information technology have criticized the utopian vision of a flight from the body. Similarly, critics of the new reproductive technologies and genetics have expressed concern about the potential enhancement of bodies, such as it is envisioned by some geneticists and reproductive scientists. This book rests on the assumption that these concerns need not result in technophobic rejections and appeals to "pure" nature and "uncontaminated" bodies. Rather, in exploring current reconfigurations and remediations of bodies and embodied subjects as "bits of life," we pursue a technophilic yet critical approach as well as thoroughly reflected articulations of new ethical standards. This critical approach, in highlighting the problems as well as the potentials of biocultures and technoscience, constitutes a shared frame of reference for the contributions to this volume.

In *Bits of Life*, we bring together feminist studies of media, biocultures, and technoscience. So far, each of these aspects of feminist studies has developed independently, and there has been too little cross-referencing. We break with the tra-

dition in feminist scholarship that looks at biotechnologies, information technologies, and media as separate phenomena; instead, we create synergy and bridge the gap between the different studies of biocultures, new media, and technoscience. We do so by building on long-standing traditions in feminist cultural studies of technoscience while also looking for the convergences between different approaches.

To understand the new modes and codes of our increasingly technologized lives, we need new forms of media literacy as well as new tools and frameworks for interpreting technobodies. The rapidly changing information and communication technologies and the fast-growing repertoire of biotechnologies have produced the need for new communicative and analytical protocols. These in turn necessitate increased forms of familiarity with the technologies themselves. The convergences between and among digital media, information technologies, and biotechnologies call for specific methodological tools and theoretical approaches. The framework of blurred boundaries (human/machine, nature/culture, technology/organism, sex/gender) heralded by the cyborg figuration has proved a fruitful one for feminist cultural studies of technoscience, and it constitutes a point of departure for this book. But, as we have already argued, we want to push the discussion still further and enlist the "bits of life" figure in our questioning of fixed entities and boundaries.

This implies, first, that the practice of science criticism and the philosophy of science require an interrogation from many perspectives—from ontology, epistemology, ethics, and politics, for example. A more hybrid and dynamic approach is needed, one that goes beyond the science wars of the 1990s (Gross and Levitt 1994), which itself is an echo of the "two cultures" debate of the 1950s (Snow 1993), as Maureen McNeil shows in chapter 2. A new alliance is needed among feminist theory, cultural studies, and studies in science and technology. This volume aims to further such an alliance.

Second, the return of the "real body," in all its thick materiality, spells the end of the linguistic turn, in its postmodernist overemphasis on textuality. With this book, we hope to effectuate a change in feminist cultural studies, urging the field to go beyond classical notions of semiotics and hermeneutics, and on to explorations of new material-semiotic approaches that can lead to a "materialized deconstruction that literary Derrideans might envy" (Haraway 1997: 102). We reintroduce a certain materialism and realism in exploring new forms of a cinematic or digital aesthetic that moves beyond representation. The new biotechnological discourses bring to the fore the material foundations of the embodied self, including its biological and genetic material. The emphasis on life marks a shift away from the deconstruction of layers of textuality, and toward an understanding of the inextricable

entanglement of material, biocultural, and symbolic forces in the making and unmaking of the subject.

Third, this methodological shift poses a challenge to the dominating social constructivist trends in feminist theory. The emergence of life itself as a subject of investigation highlights the limits of social constructivism as a method of accounting for the "hybrid" structure of contemporary technological culture. A phenomenon like the emergent biocultures cannot be dealt with in the conventional language and methodology of the social sciences. It is a transversal phenomenon that calls into question a cluster of factors, and of multiple effects. Digitization and globalization add their impacts to these complex processes. Therefore, we must develop scientific thinking at the intersection of different domains and learn to think in terms of processes and interrelations. The emergence of "bits of life" as a subject forces a new relationship between the natural sciences and the social sciences, restructuring the position of the embodied and embedded material foundations of "life" as well as the social and symbolic representations that sustain them.

Fourth, our approach raises the question of feminist activities in academia. Here, we can briefly offer some background information about the joint project of which this book is one result. *Bits of Life* grew out of a series of European seminars and conferences, funded primarily by the Netherlands Organization of Scientific Research but also by the Danish Research Agency, that took place within an international exchange program at the beginning of the new millennium. Over the years in which these seminars and conferences were held, academics from the Netherlands, Denmark, Sweden, England, and the United States were involved in a particular program titled "Media, Cultural Studies and Gender: Looking for the Missing Links." The project was also linked to the Advanced Thematic Network in Activities in Women's Studies in Europe (ATHENA), a European network of departments and programs of women's studies from more than a hundred European universities.[2] Thus this project of contemporary feminist theory has been funded by national governments as well as by the European Union.

Europe is a transnational entity, and so our work is situated in both multiculturalism and polylingualism (Griffin and Braidotti 2002). Much of our work has been translated into English from other languages. Our terms of cultural reference are necessarily different from those in the North American context, and so we may choose different cultural metaphors or implicitly express our theoretical alliance with the materialism of continental philosophy. Moreover, the European context of our work means that we may have different experiences of power relations in biocultures and technoscience. For example, stem cell research and genetic engi-

neering are a part of our university environments. The politics of life and death also vary considerably, from the U.S. right-wing crusade against abortion to the law allowing euthanasia in the Netherlands. As a result, many of the authors of this book engage with U.S. scholarship and U.S. popular culture as partial outsiders. For the authors of *Bits of Life*, such differences along cultural and national lines have led to lively discussions and thought-provoking exchanges, which we hope have found their way into this collection.

Bits of Life is divided into four parts, each part consisting of essays that are published here for the first time. The book also includes an interview with Donna Haraway (chapter 3), one of the most prominent scholars in the field of feminist technoscience studies.

Part 1, "Histories and Genealogies" (chapters 1–3), presents technoscience studies as a shared theoretical and methodological frame of reference for the book and introduces the reader to the complex history of the interlocking and overlapping fields of feminist studies, cultural studies, and science and technology studies. Thus the first two chapters map out genealogies of the hybrid field of feminist cultural studies of technoscience.

In chapter 1, Nina Lykke sets herself the impossible task of mapping an implosion—the dynamic, open-ended implosion of interdisciplinarity. She draws up a diagram of the three fields of overlap that constitute feminist cultural studies of technoscience: feminist studies, cultural studies, and science and technology studies. In so doing, she spells out the key dynamics of each field as well as the many intersections between and among them. Lykke argues that the founding act of each field consists of a deconstruction. In the case of feminist studies, this is the deconstruction of gender; in cultural studies, that of the opposition between high and low culture; and in science and technology studies, that of the positivist notion of science as rational progress. She concludes the chapter by invoking the figure "bits of life" as a follow-up to the figure of the cyborg, blurring the boundaries between organism and technology, and between matter and discourse. "Bits of life," then, is an imploded knot from which an infinite number of threads can be untangled.

In chapter 2, Maureen McNeil carefully traces the various histories of this interdisciplinary area, investigating feminist contributions from such disciplines as cultural anthropology, literary studies, art history, film studies, and science fiction studies. She discusses the complicated relationship between the interdisciplinary field of British cultural studies and the field of technoscience studies. She explores the reasons why it took a long time for mainstream British cultural studies to become interested in technoscience issues, and why feminists took the lead. McNeil also

emphasizes the strong contributions of feminists and other cultural studies scholars to the reorientation of science and technology studies from a focus on the high culture of science to the meaning of technoscience in everyday life.

In chapter 3, the interview by Nina Lykke, Randi Markussen, and Finn Olesen with Donna Haraway, the interview subject comments extensively on her style as an author, moving in between the literary and the theoretical. Surprisingly for an atheist, Haraway links her unorthodox style to the Catholic tradition of "unnameableness." She makes clear that the area of language, narrative, and rhetoric cannot be divorced from science without the risk of serious reductionism. For her, the use of categories—the effort to rename and resituate them for tactical reasons—is an act of modest witnessing. She also comments on the position of feminists as both insiders and outsiders in science and technology studies.

Part 2, "Reconfigured Bodies" (chapters 4–7), looks at different kinds of bits of life that are known for their ability to reconfigure the biological body in the age of biocultures and technoscience. We are talking here about such bits of life as hormones, eggs and sperm, germ cells, and genes. These are analyzed through the different lenses of scientific discourses, public debates, in vitro fertilization, science documentaries, and Hollywood cinema.

In chapter 4, Celia Roberts explores shifting discourses in the field of endocrinology that have been central to the production of scientific models of sexual difference. Endocrinology is one of the fields where a shift from a "mechanical" to an "informational" body took place as early as in the beginning of the twentieth century. The understanding of hormones as "messengers of sex" is an example of the convergence between scientific discourses and info- and biosciences. Against this background, Roberts analyzes the implications of the discursive shift from a bounded, hormonal body to an unbounded, fluid body extending beyond the sealed boundary of the individual body. She pursues these issues by comparing scientific discourses and public debates on hormone-replacement therapy and on endocrine-disrupting chemicals in the environment.

Chapter 5, by Amade M'charek and Grietje Keller, shifts the perspective from hormones to germ cells, from endocrinology to new reproductive technologies. M'charek and Keller perform ethnographic research to analyze how reproductive technologies both disturb and reconstruct notions of sex, gender, parenthood, kinship, and nationhood. To make their point, the authors look at convergences between two very different uses of IVF techniques, one in human infertility treatment and one in cattle breeding. By comparing the performance of IVF technologies in the human and animal realms, they are able to show how categories like kinship and

parenthood are constructed by technological interventions. In the age of genetics, IVF technologies reconfigure the relations between genetic and social parenthood. An understanding of the way in which IVF technologies travel between the contexts of human and animal reproduction may help to undermine the biological determinist idea that genetic parenthood and the social couple should coincide.

In chapter 6, Mette Bryld and Nina Lykke take on the Swedish science photographer Lennart Nilsson, who has become world-famous for his images of the fetus in the womb. Bryld and Lykke compare the Swedish and U.S. versions of one of Nilsson's most recent films on human reproduction. While both films are firmly rooted in a positivist and objective version of natural science, the Swedish film has a much more conservative framework. It adheres more strongly to the objective tone of the genre of the documentary, thus mystifying heterosexuality and reproduction, while the U.S. version includes a personalized story that allows for the more experiential narrative of a multicultural couple. Moreover, the scientific story of reproduction is significantly different in the two films, with the U.S. version favoring a more "modern," equality-oriented tone.

In chapter 7, Jackie Stacey explores reconfigured bodies in fictional cinema, analyzing the way in which popular Hollywood cinema stages genetics. How does cinema work around the dilemma that the gene has no visual signifier? Stacey illustrates the potentials for genetic engineering of (new) bodies in relation to gender and sexuality by discussing in detail two science fiction films, *Gattaca* and *Species*. Both foreground cultural anxieties about complex and confusing relationships between and among cultural identities, genetic makeup, and genetic engineering of bodies. The juxtaposition of the two films enables Stacey to discuss the quests for detection and deception that are part and parcel of the genetic imaginary. She shows how *Gattaca* puts a masculine desire for mastery of technologies on display, while *Species* exposes genetically engineered femininity as a monstrous threat to scientific control.

In Part 3, "Remediated Bodies" (chapter 8–10), the focus shifts from reconfigurations of bodily "life bits" to remediation—that is, to bodies, body parts, and embodied subjectivities (re)produced by the movement from one medium to another. In focus here are the digitization of personal memories, tunnel images in science fiction films and biomedical documentaries, and body assemblages in a hypertext novel.

José van Dijck, in chapter 8, explores the way in which personal memory is affected by the possibilities of digital storage, tracing the cultural fantasy of a universal memory machine as a desire for total recall and total control. Van Dijck takes the example of a digital project, "MyLifeBits," which allows the user to store personal bits

of life in the computer. While she finds that digitization of memory gives rise to new forms of materiality in practices of remembering, she remains critical of the promises of new software programs to fix and preserve private memories. She calls for a deeper understanding of the social changes that come along with new technologies for remediating what is dearest to us—our very personal memories.

In chapter 9, Anneke Smelik explores the digital remediations of the human body in science fiction films and biomedical documentaries. She compares a recurring moment in both genres: the spectacular ride through a tunnel, either into cyberspace or into the human body. Discussing examples that range from B movies like *Freejack* to the sophisticated trilogy of *The Matrix*, she points out the heavy traffic between and among virtual/real, inner/outer, and fact/fiction that is performed by the tunnel ride. Smelik suggests that kinetic representations of cyberspace are informed by images of the inner space of "real" bodies, as taken from documentaries (her example is the prime BBC series *The Human Body*). She argues that "inside out" and "outside in" are collapsed into an imaginary space that thoroughly confuses the real and the virtual.

Jenny Sundén, in chapter 10, also explores the virtual. She reads a hypertext novel, Shelley Jackson's *Patchwork Girl*, for its questioning of the limits of bodies, and of life itself. This digital novel, intensely involved with issues of monstrosity and femininity, tells the story of the female mate of Frankenstein's monster. Working from the materiality of hypertext fiction, Sundén shows how information technology comes to act as reproductive technology that reproduces not only texts and images but also the life itself of the she-monster. *Patchwork Girl* has been read as a postmodern celebration of a poetics of the fragment, but Sundén argues that it actually speaks of being fragmented as severely painful. "Bits of life" become the quintessence of the monster's fractured subjectivity.

Part 4 (chapters 11 and 12) moves on to philosophy, presenting different approaches to posthuman materialism. In chapter 11, Karen Barad takes her lessons from Schrödinger's cat, that famous rhetorical device for paradoxical exposure of the materiality of quantum mechanics. She tries to displace the natural sciences' claims to objectivity, arguing instead for an understanding of the mutual implications of the material and the discursive. Life, she says, is not an inherent property of individuals but is performed through its material phenomena and discursive practices. Therefore, the matter of life can be understood only in its dynamic process of becoming.

The notion of becoming is also central to chapter 12, by Rosi Braidotti, who proposes an understanding of life as "zoe," by which she means a vitalistic and gener-

ative life. Zoe allows for an affirmative appreciation of life. Braidotti extensively traces the history of "life as zoe" in philosophy and goes on to develop the concept of a sustainable self. She embraces the ethical principle of affirmation by putting forward what she calls a "sustainable nomadic ethics." The concept of nomadism points to an understanding of the self and of the subject as a dynamic process of continuous becoming. In order for that nomadic self to be sustainable, Braidotti argues, the subject needs endurance. Endurance, for her, is joyful affirmation as the inherently positive potential of the subject. Thus Braidotti develops a new figuration of living subjectivities in the posthumanist mode.

Bits of Life highlights the search for tools and theories by which it becomes possible to analyze the complex interplay among textual, visual, imaginary, technological, and biological dimensions of bodies, of subjects, and of life. We hope that the reader will find various ways of assessing methodological and theoretical frameworks for feminist research of media, biocultures, and technoscience. Each of the chapters that follow tackles "bits of life" in their many manifestations in art and popular culture, the humanities, and the sciences.

NOTES

1. We take this phrase from the Biocultures Project of the University of Illinois at Chicago, which organized a conference and webcast in March 2005 titled "Biocultures: An Emerging Paradigm."

2. See Braidotti, Nieboer, and Hirs (2002); for related material, see also www.let.uu.nl/womens_studies/athena/outcomes.html (retrieved March 2, 2007).