Preface

TECHNOETHICS AND NEW DILEMMAS IN THE AGE OF TECHNOLOGY

Ethical Considerations in the Age of Technology

The verdict is in—society has successfully raised technology from an infant. But are humans mature enough to provide ethical nurturing and responsible direction as it continues to grow and evolve into a teenager? This is a tough question to answer and one that requires a serious consideration of our roles as guardians of multiple children: technology, humanity, and the world inhabited by technology and humans. To begin, infants are a blessing that give meaning and inspiration to many that are parents. But, most parents also remember that it was not all fun and games during those early years of changing diapers, late nights with baby and sleep deprivation. The same can be said of technology in its infancy. Since the emergence of organized society thousands of years ago, humans have created technology to survive in the world by forging of tools and weapons, constructing shelters for protection from the elements, creating factories organizational structures, and cultivating crops and livestock for food. This came with its own ethical problems and dilemmas for its human creators—war, environmental destruction, and human exploitation.

When infants become toddlers and then children, parents get to witness first words, first steps, and other developmental advances that make parents’ hearts melt. At the same time, it is hard for parents to forget the temper tantrums, messy bedrooms, damaged furniture, and endless household cleanups. Similarly, beginning in the mid 20th century, the information revolution was nurtured in by the creation of the Internet, the development of new information and communication technologies (ICT’s), and the convergence of ICT’s allowing individuals to more freely interact and exchange multiple types of information content through increasingly smaller multi-purpose mobile technologies. This was a wonderful time in technological childhood. Jenkins described this convergence, as “the flow of content across multiple media platforms, the cooperation between multiple media industries, and the migratory behaviour of media audiences “(p. 6). Again this came with its baggage and more ethical dilemmas— digital piracy, cyberespionage, online identity theft, Internet addiction, and online bullying.

When children become adolescents the joy of parenting is seen in watching them succeed in school, participate in a play or sporting event, go to prom, and graduate from high school. Again there are difficult moments of adolescent rebellion, bullying at school, and even more damaged furniture and household cleanup to deal with. At the same time, other technology convergences across biotechnology, nanotechnology, information technology and cognitive science (NITC) have given rise to technology advancements that are re-shaping the very boundaries of human life and identity within society helping amputees walk, improving chances for healthy reproduction, helping individuals with depression cope
and more. But we also must deal with the dark side of technological adolescence—ethical dilemmas concerning human cloning, bioterrorism, genetically modified food, and public fears of the loss of humanity resulting from the misuse of human enhancement technologies.

As humans continue on the parenting trajectory with human and technological teeneggers, there are strategies that can be drawn on to reduce the risk of unintended consequences of technological development that human creators want to avoid. In the next sections we look at the present context of human-technological interwovenness followed by a brief introduction to the field of technoethics as a means of generating knowledge about new dilemmas revolving around technological advancement to help guide ethical decision-making and responsible action.

**The Ethical Challenges of Technoselves Living in a Technosociety**

Selves are the ultimate negentropic technologies, through which information temporarily overcomes its own entropy, becomes conscious, and is finally able to recount the story of its own emergence in terms of a progressive detachment from external reality. There are still only informational structures. But some are things, some are organisms, and some are minds, intelligent and self-aware beings. Only minds are able to interpret other informational structures as things or organisms or selves. And this is part of their special position in the universe. –Floridi, 2011

Floridi’s quote provides just a glimpse at the interwovenness of humans, science, and technology within our evolving society. The rise of new technologies throughout the 20th century have transformed life and society in significant ways by offering new machines, tools, and techniques to advance core areas of human activity including transportation, construction, information transfer, communication, medicine, education, and economics. These transformations have been both outward and inward, challenging the very nature of human existence and what it means to live harmoniously with one another in a society that revolves around technological progress and innovation. One emerging area of technoethical inquiry and debate revolves around the very nature of our human condition as technoselves (Luppicini, 2012a) and what it means to be human amidst a myriad of human enhancement technologies that allow us to augment human bodies and minds in substantive ways. There are a variety of human enhancing technologies currently available or in development which have spurred public debate and concern (e.g., plastic surgery, prosthetic limbs, exoskeletons, performance and mind enhancing drugs, biosensors, neural implants, wearable computers, etc.). These technologies (and other to come) are being scrutinized as an (un)ethical means of altering or transforming the human condition itself. Another area of technoethical inquiry examines the moral impact of new digital technologies and the ethical dilemmas surrounding the boundaries of the social world itself as we struggle to navigate the juxtaposition of both online and offline lives while trying to avoid the many risks and pitfalls that rise from the technosociety (e.g., cybercrime, internet addiction, smart technologies, increasing automation, moral agency in machines, robot rights and responsibilities, etc). Under the umbrella of Technoethics, this book highlights new work in these and other areas of life and society where ethical, moral, and social dilemmas arise from technological progress.

**Background of Technoethics as a Field of Research**

A number of seminal publications can be cited as key drivers in the formalization of Technoethics as an interdisciplinary research field. These publications brought together leading technology and ethics
scholars from around the world and provided a solid intellectual platform upon which to grow. First, the two volume Handbook of Research on Technoethics (Luppicini & Adel, 2009) drew on the contributions of over 100 experts from around the world working on a diversity of areas where technooethical inquiry. Next, the first reader in Technoethics, Technoethics and the Evolving Knowledge Society: Ethical Issues in Technological Design, Research, Development, and Innovation (Luppicini, 2010) was published for use at the undergraduate and graduate level in a variety of courses that focus on technology and ethics in society. The text focused on a broad base of human activities connected to technology interwoven within social, political, and moral spheres of life. It engaged readers in the study of key ethical dimensions of a technological society and helped reinforce work found in the Handbook. Together, these publications helped set the stage for the creation of the International Journal of Technoethics in 2010.

In 2013, the *International Journal of Technoethics* (Rocci Luppicini-Founding Editor-in-Chief), now in its fourth year, continues to provide a forum for scholarly exchange among philosophers, researchers, students social theorists, ethicists, historians, practitioners, and technologists working in areas of human activity affected by technological advancements and applications. With the strong support of IGI Publishing, the journal retains its founding Editor-in-Chief and its twelve Associate Editors, namely, Allison Anderson (University of Plymouth), Keith Bauer (Marquette University), Josep Esquirol (University of Barcelona), Deb Gearhart (Troy University), Pablo Iannone (Central Connecticut State University), Mathias Klang (University of Lund), Andy Miah (University of the West of Scotland), Lynne Roberts (Curtin University of Technology), Neil Rowe (U.S. Naval Postgraduate School), Martin Ryder (Sun Microsystems), John Sullins III (Sonoma State University), Mary Thorseth (NTNU). The mission of the journal was as follows:

The mission of the *International Journal of Technoethics* (IJT) is to evolve technological relationships of humans with a focus on ethical implications for human life, social norms and values, education, work, politics, law, and ecological impact. This journal provides cutting edge analysis of technological innovations, research, developments policies, theories, and methodologies related to ethical aspects of technology in society. IJT publishes empirical research, theoretical studies, innovative methodologies, practical applications, case studies, and book reviews. IJT encourages submissions from philosophers, researchers, social theorists, ethicists, historians, practitioners, and technologists from all areas of human activity affected by advancing technology (*International Journal of Technoethics*, 2013).

This present collection of chapters is derived from the second year of the *International Journal of Technoethics*. It provides coverage of cutting edge work from a variety of areas where technooethical inquiry is currently being applied.

The Importance of Technoethics in the Age of Technology

As the unity of the modern world becomes increasingly a technological rather than a social affair, the techniques of the arts provide the most valuable means of insight into the real direction of our own collective purposes - Marshall McLuhan, 1951

The modern world, as depicted by McLuhan over 70 years ago is continuing to evolve (technologically, individually, and socially) as humans attempt to weave the benefits of technological progress with the need to further collective purposes of humans living together in a society that embraces progress and innovation. This is a challenging act of gymnastics and one in which field of Technoethics has attempted to meet. Technoethics developed through the coming together of technology experts (philosophers, technicians, administrators, instructors, students, and researchers) struggling with the many dilemmas
arising from public controversies and ethical debate created by technological advancement in society. This interdisciplinary research field provided a means to transcend traditional approaches in the study of ethics and technology driven by existing philosophical approaches, intellectual analyses of pervasive problems, and logical reasoning. It provided a multifaceted intellectual platform for experts working at the nexus of applied work in technology and ethics (e.g., bioethics, engineering ethics, computer ethics, etc.). The types of scholars attracted to this field are scholars and technology experts working in new areas of technology research where social and ethical issues emerge (i.e., genetic research, nanotechnology, human enhancement, neurotechnology, robotics, reproductive technologies, etc). The current state of Technoethics is marked by an openness to multiple forms of scholarly inquiry and practical real world value. As stated in Luppicini (2012b):

As pioneering breakthroughs are made in technological advancements and applications, novel questions arise regarding human values and ethical implications for society, many of which give rise to ethical dilemmas where conflicting viewpoints cannot be solved by relying on any one ethical theory or set of moral principles. Accordingly, the field of Technoethics takes a practical focus on the actual impacts (and potential impacts) of technology on human beings struggling to navigate the “real world” of technology. In many cases, this leads to the creation of more questions than answers in an effort to discern the underlying ethical complexities connected to the application of technology within real-life situations.

Objectives of this Book

In one word, science (critically undertaken and methodically directed) is the narrow gate that leads to the true doctrine of practical wisdom, if we understand by this not merely what one ought to do, but what ought to serve teachers as a guide to construct well and clearly the road to wisdom which everyone should travel, and to secure others from going astray.

-Immanuel Kant, 1898

The above passage from Kant highlights the role of intellectual inquiry as a means of guiding the construction of knowledge from which to offer ethical guidelines for practice and boundaries to guard against going astray. This edited book presents a selected collection of studies in an effort to build on the existing intellectual platform within the field of technoethics. As a rapidly expanding area of inquiry, technoethics draws on and goes beyond traditional ‘ethics of technology’ and ‘philosophy of technology’ approaches which highlight longstanding ethical theories and controversies for intellectual analysis. Technoethics also deals with current (and future) problems in science and technology innovation at the intersection of human life and society. As such, it brings into play an interdisciplinary base of scholarly contributions from pure philosophy, the social sciences, humanities, engineering, computing, applied sciences and other areas of scholarly inquiry into technology and ethics. This interdisciplinary focus is helping to leverage ethical analysis, risk analysis, technology evaluation, and the combination of ethical and technological analyses within a variety of real life decision-making contexts and future planning situations faced by 21st century society.

The significance of the selected chapters appearing in this volume can be attributed to a variety of factors including high peer review standards, the timeliness of the topics covered, author attention to research protocols and methodological procedures, perceived contribution to research knowledge on ethics and technology, and perceived contribution to practice. Both empirical and theoretically oriented chapters are offered to provide a current snapshot of new developments in the field today.
Organization of the Book

We usually see our own lives and those of others as a series of narratives, and we continually reinterpret and revise our narrative self-understanding. For example, we scroll through our cache of stories to find one that can best clarify the moral problem at hand and that we can reconcile with our self-representations and ideals - Magnani, 2007

In echoing the above passage from Lorenzo Magnani, this volume attempts to piece together the best possible collection of narrative constructions pertaining to recent developments within the field of technoethics. In terms of book organization, this book contains 21 chapters divided into separate sections to highlight a logical flow of writing organized into key thematic areas of technoethical inquiry. Section 1: Historical and Theoretical Perspectives contains 5 chapters: Chapter 1, “Virtue and Virtuality: Technoethics, IT, and the Masters of the Future” (Miles Kennedy), Chapter 2, “Internet History” (Raphael Cohen-Almagor), Chapter 3, “Laboring in Cyberspace: A Lockean Theory of Property in Virtual Worlds” (Marcus Schulzke), Chapter 4, “Perverting Activism: Cyberactivism and its Potential Failures in Enhancing Democratic Institutions” (Tommaso Bertolotti, Emanuele Bardone, and Lorenzo Magnani), and Chapter 5, “On the Moral Equality of Artificial Agents” (Christopher Wareham).


Section 3: Morality and Techno-Mediated Violence contains five chapters: Chapter 12, “Structural and Technology-Mediated Violence: Profiling and the Urgent Need of New Tutelary Technoknowledge” (Lorenzo Magnani), Chapter 13, “Fairness and Regulation of Violence in Technological Design” (Cameron Shelley), Chapter 14, “Unintended Affordances as Violent Mediators: Maladaptive Effects of Technologically Enriched Human Niches” (Emanuele Bardone), Chapter 15, “Infosphere to Ethosphere: Moral Mediators in the Nonviolent Transformation of Self and World” (Jeffrey Benjamin White), and Chapter 16, “Facebook Has it: The Irresistible Violence of Social Cognition in the Age of Social Networking” (Tommaso Bertolotti).


Is there virtue in virtuality? What are the technoethical implications created through human engagement with virtual environments? How does the Internet form a backdrop for technoethical inquiry into social networking and work? How can traditional philosophical theories help inform current legal relations and property issues within virtual environments? In what ways can cyberactivism impair and advance...
institutional democracy? Could artificial agents have the high degree of moral status that is attributed to humans, and if so, how should they be treated? In Chapter 1, *Virtue and Virtuality: Technoethics, IT, and the Masters of the Future*, Miles Kennedy questions the role of virtue within the online realm. The author sheds light on how the technoethics of IT sheds light on the relationship between knowledge about information and the capacity to turn information into knowledge. This chapter speaks to students and researchers who have a stake in the virtual environment and its ethical makeup. In Chapter 2, *Internet History*, Raphael Cohen-Almagor explores milestones in the history of the Internet from a historical standpoint, social and ethical standpoint. In Chapter 3, *Laboring in Cyberspace: A Lockean Theory of Property in Virtual Worlds*, Marcus Schulzke questions property relations in massively multiplayer online games (MMOGs) through the lens of John Locke’s theory of property. This chapter helps connect the existing body of Lockean theory to current ownership rights of online gamers over the intellectual material of virtual worlds. In Chapter 4, *Perverting Activism: Cyberactivism and its Potential Failures in Enhancing Democratic Institutions*, Tommaso Bertolotti, Emanuele Bardone, and Lorenzo Magnani explore the influence of new technologies on a range of practices related to activism and cyberactivism. This chapter takes a sobering look at the strengths and weaknesses of cyberactivism in leveraging institutional democracy. Then, in Chapter 5, *On the Moral Equality of Artificial Agents*, Christopher Wareham focuses on the fact that robots are beginning to perform increasingly significant ethical roles in society which calls into question the rights and moral responsibilities of these creations. The author advances a respect-based account of the ethical criteria for moral agents along with an empirical test for artificial agents to be considered as having rights and duties of human agents.

What are biometric technologies and why is their use creating ethical debate in society? How can biometrics and profiling challenge individual privacy and democracy? How are new capacities for human surveillance offered by ICT’s affecting human relationships and interactions in society? How is technology being used to engage in cybercriminal activities such as information theft, cyberbullying, cyberespionage, and institutional sabotage? In Chapter 6, *Biometrics: An Overview on New Technologies and Ethic Problems*, Halim Sayoud questions the role of biometric technologies (automated methods of verifying the identity of a living person based on physiological or behavioral characteristics) in society. The chapter provides an overview of key historical developments and current uses of biometric technologies. Important contributions of biometric technologies are explored along with possible ethical problems that may result from their misuse. In Chapter 7, *On Biometrics and Profiling: A Challenge for Privacy and Democracy?*, Daniele Cantore looks at the advancement of profiling (collecting and organizing individuals’ preferences and attitudes as consumers and costumers) and biometric technologies (collecting biological and behavioural data from humans) from an ethical perspective. This chapter provides a much needed look at biometrics in relation to current concepts of democracy, technological development, violence, and privacy issues. In Chapter 8, *Cellular Telephones and Social Interactions: Evidence of Interpersonal Surveillance*, Steven E. Stern and Benjamin E. Grounds present an empirical study on how cellular telephones have made it possible for members of romantically involved couples to keep track of each other. The authors surveyed 69 undergraduates on cellular telephone use, finding that that nearly 25% of romantically involved cellular telephone users admit to tracking their significant other. The chapter raises questions concerning trust, privacy, and surveillance. In Chapter 9, *Socio-Technical Influences of Cyber Espionage: A Case Study of the GhostNet System*, Xue Lin and Rocci Luppicini examine the largest cyberespionage network (GhostNet) to date. Using the Actor-Network Theory, these authors delve into the ethical, technical, and communicative processes at work. In Chapter 10, *The Impact of Context on Employee Perceptions of Acceptable Non-Work Related Computing*, Troy J.
Strader, J. Royce Fichtner, Suzanne R. Clayton, and Lou Ann Simpson, look at a common concern faced by organizations around the world. This timely study focuses on the relationship between employee’s ethical orientation, underlying factors which influence employee ethical perceptions, and employee perceptions regarding the acceptability of various non-work related computing activities while at work. This empirical research sheds new light on a very real challenge faced by employers and employees in negotiating the ethical boundaries of personal and professional life within the workforce. In a slightly different vein, Chapter 11, Chicken Killers or Bandwidth Patriots? A Case Study of Ethics in Virtual Reality, Kurt Reymers delves into the ever expanding virtual world where social interactions range from online gaming to identity development to business. More specifically, the author focuses on a case in the virtual world of Second Life where the sale of virtual chickens and eggs led to virtual world conflict. The chapter provides a 3-pronged examination of this virtual event as a resource dilemma, an argument from moral and psychological harm, and as an ethical case under a just war theory perspective. As highlighted by the author, “All of these virtual world phenomena, from the interactive role-playing of virtual farmers to the social, political and economic repercussions within and beyond the virtual world, can be examined with a critical focus on the ethical ramifications of virtual world conflicts.” This study opens the door to ethical inquiry into the ever expanding realm of virtual environments used increasingly by people around the world.

What is the state of morality within the context of techno-mediated violence? What is the need for technoethical knowledge when dealing with profiling technologies and practices? What are the key moral mediators in the nonviolent transformation of self and world? How does the violence of social cognition manifest itself in the age of social networking applications such as Facebook? In Chapter 12, Structural and Technology-Mediated Violence: Profiling and the Urgent Need of New Tutelary Technoknowledge, Lorenzo Magnani addresses the expanding boundaries of violence within a technology-mediated world. The author argues that, “when too much knowledge about people is incorporated in external artificial things, human beings’ visibility can become excessive and dangerous.” This insightful piece deals with the very real problem of identity and cyberprivacy, making the case that a new type of knowledge (technoknowledge) is required to help protect individuals from the various forms of information circulation about them which can be potentially harmful. In Chapter 13, Fairness and Regulation of Violence in Technological Design, Cameron Shelley expands on Magnani’s work by discussing the design of technology as it relates to the notion of fairness and the distribution of violence in modern society. The chapter demonstrates how errors arising from failed predictions can influence individuals in unintended ways that designers may not realize. Insightful recommendations offered speak to the roles of government regulation, safety issues, and need for public participation in technology design assessment. In extending the discussion about unintended consequences of technology, Chapter 14, Unintended Affordances as Violent Mediators: Maladaptive Effects of Technologically Enriched Human Niches, by Emanuele Bardone delves into the topic of violent mediators in human cognitive niches enriched by technology. The author focuses on the unintended consequences of violent mediators through examples of multitasking while driving, desultory behavior and cyberstalking. The chapter provides useful suggestions on how to counterbalance the maladaptive effects of techno-mediated violence. In Chapter 15, Infosphere to Ethosphere: Moral Mediators in the Nonviolent Transformation of Self and World, Jeffrey Benjamin White pulls together this section by examining the philosophical writing on information technology from Lorenzo Magnani and Luciano Floridi in an effort to identify challenges and opportunities for the nonviolent transformation of self and world. As expressed by White, “Though we have the capacity to construct our own selves, our world, and the myths in light of which self and world all make sense,
choosing the right story, and living accordingly, is a most difficult task.” This chapter pulls together insights from key resources in moral philosophers to highlight the importance of moral mediation in the nonviolent transformation of self and world. Then, in Chapter 16, Facebook Has it: The Irresistible Violence of Social Cognition in the Age of Social Networking, Tommaso Bertolotti finishes this section by exploring how transparent social networking technologies can cause violence in everyday life and society. The author focuses on the role of online gossip in the social evolution of human beings along with potentially violent consequences of techno-mediated gossip that should be avoided.

What are some of the current trends and applications in technoethics? What is the state of Science and Technology Studies (STS) in countries like Canada where democratic values, social welfare, and human rights are core to the political landscape and national identity? What are educational opportunities and challenges in teaching about piracy and ethics to college students? What are the similarities that can be drawn between pedagogy and the current discourse on technology and ethics? What are technoethical considerations in nuclear waste management in the 21st century? How can research in complex areas of science and technology innovation proceed where informed consent from human participants is not possible? In Chapter 17, Technoethics and the State of Science and Technology Studies (STS) in Canada, Rocci Luppicini examines the nature of science and technology in Canada by looking at state of ethics within STS curriculum at Canadian post-secondary institutions. Findings from this chapter reveal that ethical aspects of science and technology study are lacking within most Canadian academic programs in STS. A number of key challenges and recommendations are offered to help inform strategic change in STS program development at the university level. In a similar vein, Chapter 18, College Students, Piracy, and Ethics: Is There a Teachable Moment?, by Jeffrey Reiss and Rosa Cintrón, addresses the ethical problem of piracy and piracy prevention techniques. As a point of reference, the authors focus on piracy prevention tools and techniques used by IT departments in the Florida State University System to assess their relative effectiveness in combating digital piracy. In this empirical study a survey was administered to IT department’s security officers within the 11 Florida State University System (SUS) institutions. Findings revealed that the majority of IT department’s security officers believed students had little concern over the consequences of their actions and would engage in digital piracy off campus. Respondents were divided as to whether the integration of ethical training for students would lessen the need for the use of network monitoring software on campus. Challenges for implementing mandatory ethics training for college students were also discussed. In Chapter 19, Boys with Toys and Fearful Parents? – The Pedagogical Dimensions of the Discourse in Technology Ethics, Albrecht Fritzschke takes a sobering look at the reality of technology in developmental terms of when it enters our lives. As elegantly noted by the author, “Technology does not come into our lives when we reach maturity. Most of us probably got acquainted with technical operation at a much earlier age, when we played with wooden blocks, model cars and plastic hammers.” The author effectively draws attention to the need for more philosophical studies of technology that focus on technology and children to add to the sea of intellectual scholarship on technology use and abuse among adults. This chapter offers a unique perspective on existing gaps in the literature on technology and ethics to inform future research and theory. In Chapter 20, Without Informed Consent, Sara Belfrage delves into the tricky area of human research within our technological society where the complexities of research, economic realities, cultural dynamics, and other forces can challenge adherence to ethical research guidelines. Given the intricacies of technology development and the need for human research where informed consent is difficult, this chapter provides a practical take on categories of cases where informed consent cannot be used. This helps shape the discourse on research and ethics within the evolving technological society (Luppicini,
Finally, in Chapter 21, *The Middle Ground for Nuclear Waste Management: Social and Ethical Aspects of Shallow Storage*, Alan Marshall, places this timely study within the context of recent 2001 terrorist attacks in the USA and the 2011 nuclear disaster events in Japan. The author provides a selective review of key events that shaped the history of nuclear energy and waste management techniques that are available to deal with a controversial and needed category of technologies that affect not only the present generation but future populations that will inherit the burden of this current technological activity. The chapter attempts to provide a middle ground solution for nuclear waste management that meets the needs and values of our evolving technological society.

In summary, this collection provides a glimpse at the latest developments in technoethics in the hopes of helping readers better navigate the murky ethical and social waters created by a broad range of ‘new’ technological advances within society today. As the editor of this volume, it is a privilege to present the following twenty-one chapters which delve into the current state of technoethics and new dilemmas in the age of technology.

*Rocci Luppicini  
University of Ottawa, Canada*

**REFERENCES**


