
THE HANDBOOK OF INFORMATION AND COMPUTER ETHICS

Edited by

Kenneth Einar Himma and Herman T. Tavani

 **WILEY**

**THE HANDBOOK
OF INFORMATION
AND COMPUTER ETHICS**

THE HANDBOOK OF INFORMATION AND COMPUTER ETHICS

Edited by

Kenneth Einar Himma and Herman T. Tavani

 **WILEY**

Copyright © 2008 by John Wiley & Sons, Inc. All rights reserved

Published by John Wiley & Sons, Inc., Hoboken, New Jersey
Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400, fax 978-646-8600, or on the web at www.copyright.com. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008.

Limit of Liability/Disclaimer of Warranty: While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor the author shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

For general information on our other products and services please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993 or fax 317-572-4002.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print, however may not be available in electronic formats.

Library of Congress Cataloging-in-Publication Data:

The handbook of information and computer ethics / edited by Kenneth Einar Himma and Herman T. Tavani.

p. cm.

Includes index.

ISBN 978-0-471-79959-7 (cloth)

- I. Electronic data processing—Moral and ethical aspects. I. Himma, Kenneth Einar.
- II. Tavani, Herman T.
QA76.9.M65H36 2008
004.01'9—dc22

2007044568

Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

For my wife, Maria Elias Sotirhos, and my nieces, Angela and Maria Katinas

KEH

In memory of my mother-in-law, Mary Abate

HTT

CONTENTS

Foreword	xi
<i>Deborah G. Johnson</i>	
Preface	xiii
Contributors	xvii
Introduction	xxiii
<i>Kenneth Einar Himma and Herman T. Tavani</i>	
PART I: FOUNDATIONAL ISSUES AND METHODOLOGICAL FRAMEWORKS	1
1. Foundations of Information Ethics	3
<i>Luciano Floridi</i>	
2. Milestones in the History of Information and Computer Ethics	25
<i>Terrell Ward Bynum</i>	
3. Moral Methodology and Information Technology	49
<i>Jeroen van den Hoven</i>	
4. Value Sensitive Design and Information Systems	69
<i>Batya Friedman, Peter H. Kahn Jr., and Alan Borning</i>	
PART II: THEORETICAL ISSUES AFFECTING PROPERTY, PRIVACY, ANONYMITY, AND SECURITY	103
5. Personality-Based, Rule-Utilitarian, and Lockean Justifications of Intellectual Property	105
<i>Adam D. Moore</i>	
6. Informational Privacy: Concepts, Theories, and Controversies	131
<i>Herman T. Tavani</i>	
7. Online Anonymity	165
<i>Kathleen A. Wallace</i>	

8. Ethical Issues Involving Computer Security: Hacking, Hacktivism, and Counterhacking	191
<i>Kenneth Einar Himma</i>	
PART III: PROFESSIONAL ISSUES AND THE INFORMATION-RELATED PROFESSIONS	219
9. Information Ethics and the Library Profession	221
<i>Kay Mathiesen and Don Fallis</i>	
10. Ethical Interest in Free and Open Source Software	245
<i>Frances S. Grodzinsky and Marty J. Wolf</i>	
11. Internet Research Ethics: The Field and Its Critical Issues	273
<i>Elizabeth A. Buchanan and Charles Ess</i>	
12. Health Information Technology: Challenges in Ethics, Science, and Uncertainty	293
<i>Kenneth W. Goodman</i>	
13. Ethical Issues of Information and Business	311
<i>Bernd Carsten Stahl</i>	
PART IV: RESPONSIBILITY ISSUES AND RISK ASSESSMENT	337
14. Responsibilities for Information on the Internet	339
<i>Anton Vedder</i>	
15. Virtual Reality and Computer Simulation	361
<i>Philip Brey</i>	
16. Genetic Information: Epistemological and Ethical Issues	385
<i>Antonio Marturano</i>	
17. The Ethics of Cyber Conflict	407
<i>Dorothy E. Denning</i>	
18. A Practical Mechanism for Ethical Risk Assessment — A SoDIS Inspection	429
<i>Don Gotterbarn, Tony Clear, and Choon-Tuck Kwan</i>	
PART V: REGULATORY ISSUES AND CHALLENGES	473
19. Regulation and Governance of the Internet	475
<i>John Weckert and Yeslam Al-Saggaf</i>	
20. Information Overload	497
<i>David M. Levy</i>	

21. Email Spam	517
<i>Keith W. Miller and James H. Moor</i>	
22. The Matter of Plagiarism: What, Why, and If	533
<i>John Snapper</i>	
23. Intellectual Property: Legal and Moral Challenges of Online File Sharing	553
<i>Richard A. Spinello</i>	
PART VI: ACCESS AND EQUITY ISSUES	571
24. Censorship and Access to Expression	573
<i>Kay Mathiesen</i>	
25. The Gender Agenda in Computer Ethics	589
<i>Alison Adam</i>	
26. The Digital Divide: A Perspective for the Future	621
<i>Maria Canellopoulou-Bottis and Kenneth Einar Himma</i>	
27. Intercultural Information Ethics	639
<i>Rafael Capurro</i>	
Index	667

FOREWORD

The publication of *The Handbook of Information and Computer Ethics* signifies a milestone in the field of computer ethics. The field began to emerge as a scholarly field in the late 1970s and early 1980s. Joseph Weizenbaum's *Computer Power and Human Reason* (1976) was the first extended work to draw attention to the potentially deep social implications of the new technology. During this period, privacy had been subject to a number of major studies, including Alan Westin and Michael Baker's *Data Banks in a Free Society* (1972). The first works by philosophers began to appear in the 1980s, and in 1985 Terrell Bynum published a special issue of *Metaphilosophy* pulling together these first works and making them more available to the philosophical community. That year, 1985, was also the year in which my own *Computer Ethics* was first published.

Perhaps it is an understatement to say that in the twenty-plus years since the appearance of these first works, the field of computer ethics has flourished enormously. Of course, the development of the field has gone hand-in-hand with the development of computer and information technology. In one of the seminal articles in the field, Jim Moor identifies malleability as a key feature of computers; that malleability has meant that computer and information technology has permeated almost every domain of human activity. And, of course, wherever the technology goes, ethical issues can be found. While the flourishing of the field of computer ethics is to be celebrated, growth inevitably means pressure to split the whole into parts. The topics that need to be addressed continue to expand, and perspectives from a wide range of disciplines are relevant. Thus, there is pressure for the field to become splintered into subfields (for example, with a distinction between computer ethics and information ethics); for scholars to become specialists in one subfield (for example, to choose to become an expert in privacy or intellectual property or professional ethics); or to have subfields merged into already existing fields such as media studies, business ethics, information sciences, etc.

In this context, the publication of *The Handbook of Information and Computer Ethics* is particularly important because it aims to keep the field whole. It is intended to provide an overview of the issues and controversies in a field that has become increasingly unwieldy. As a handbook, the volume defines the field as a whole; it identifies foundational issues, provides theoretical perspectives, and includes analyses of a range of applied and practical issues. The volume does this through chapters by individuals who have been working in the field from the

beginning, as well as works by scholars who have come to the field more recently. For this reason, I applaud the efforts of Kenneth Himma and Herman Tavani and welcome the publication of *The Handbook of Information and Computer Ethics*.

DEBORAH G. JOHNSON

PREFACE

In the last 10 years, information and computer ethics has emerged as an important area of philosophical and social theorizing, combining conceptual, metaethical, normative, and applied elements. Interest in the area has increased dramatically in computer science departments, philosophy departments, communications departments, business schools, information and library schools, and law schools. Information ethics has become one of the most important areas of applied philosophy in terms of professional, student, and popular interest. Many of the most pressing new ethical issues we face have arisen in connection with the use and development of new information technologies. For example, debates about the ethics of online music file sharing have led academics and ordinary citizens to reconsider the arguments for the legitimacy of intellectual property protection. New developments in information technology threaten privacy in ways that could not have been imagined 50 years ago, raising new ethical issues about the rights to privacy and anonymity. The growing dependence of large-scale economies on the Internet creates new vulnerabilities that can be exploited by hackers, cybercriminals, and terrorists, raising novel ethical issues about computer intrusions and security.

The Handbook of Information and Computer Ethics responds to this growing professional interest in information ethics with 27 chapters that address both traditional and current issues in information and computer ethics research. Each chapter, written by one or more of the most influential information ethicists, explains and evaluates the most important positions and arguments on the respective issues. As a result, the *Handbook* reader will be able to come away from each chapter with an understanding of the major positions and arguments, their strengths and weaknesses, and the author's original take on the issue. In addition, each chapter not only contains useful summaries of the most important research on the topic but also makes an important new contribution to the literature, and ends with a bibliography that identifies the most important books and articles on the topic.

Because a number of very good anthologies on information and computer ethics already exist, one might ask: Why another book of readings on ethical aspects of information and computer technology? One justification for the book is that, as noted above, each chapter in the present volume is written in a style that conforms to the objectives of a handbook and thus provides the conceptual background that is often not found in papers comprising other volumes. Consider that many papers included in those volumes are compiled from disparate sources and, thus, can reflect various styles and diverse objectives. With one exception, every chapter in this volume is an original piece that was written specifically for the *Handbook*. As such, each paper provides an

accessible but sophisticated overview of the most important positions and supporting arguments and objections, along with the author's state-of-the-art take on these positions, arguments, and objections.

Another justification for this book is that existing anthologies tend to be narrower in scope than *The Handbook of Information and Computer Ethics*. For example, many anthologies cover only a limited set of topics that affect one or more subfields of information ethics; as a result, these works often exclude some of the controversies and issues that arise in information ethics as a broader field of inquiry. Consider that some anthologies have focused on Internet- or cyber-specific issues involving information ethics,¹ while others have centered mainly on professional ethics issues affecting responsibility.² Other volumes are dedicated to information ethics concerns affecting specific topical areas such as privacy, security, and property.³ Still other anthologies have focused on ethical aspects of information technology that converge with ethics-related concerns affecting medicine and genetics/genomics research.⁴ And other anthologies are dedicated to the examination of ethical issues in information technology that intersect either with disciplines, such as philosophy, or with new or emerging fields, such as nanotechnology.⁵ So even though there is no shortage of anthologies that examine ethical issues centering on these, and related, ethical aspects of information technology, none addresses the breadth of topics covered in the present handbook.

The *Handbook* is organized into six main parts, which cover a wide range of topics—i.e., from foundational concepts and methodological approaches in information ethics (at the theoretical level) to specific problem areas involving applied or practical ethical issues.

At the theoretical level, conceptual frameworks underlying topical areas such as intellectual property, privacy, and security are examined. These frameworks provide *Handbook* readers with some conceptual tools needed to analyze more systematically the kinds of issues examined in the chapters comprising the remaining sections of the book. At the practical level, a number of contemporary controversies ranging from professional-ethical issues to issues of responsibility, regulation, and access are examined. For example, these chapters examine controversies affecting open-source software, medical informatics and genetic research, cyber-conflict, risk assessment, the digital divide, information overload, e-mail spam, online file sharing, plagiarism, censorship and free speech, and so forth. Thus, *Handbook* readers will gain an

¹See Langford, D. (Ed.). *Internet Ethics*. Macmillan, 2000; Baird, R., Reagan, R., and Ramsower, S., (Eds.) *Cyberethics*. Prometheus, 2000; Spinello, R. and Tavani, H. (Eds.). *Readings in CyberEthics*, 2nd ed. Jones and Bartlett, 2004.

²See Bynum, T. and Rogerson, S. (Eds.). *Computer Ethics and Professional Responsibility*. Blackwell, 2004.

³See Moore, A. (Ed.). *Information Ethics: Privacy, Property, and Power*. University of Washington Press, 2005; Himma, K. (Ed.). *Internet Security: Hacking, Counter Hacking, and Society*. Jones and Bartlett, 2007.

⁴See Goodman, K. (Ed.). *Ethics, Computing, and Medicine*. Cambridge, 1998; Tavani, H. (Ed.). *Ethics, Computing, and Genomics*. Jones and Bartlett, 2006.

⁵See Moor, J. and Bynum, T. (Eds.). *Cyberphilosophy*. Blackwell, 2002; Allhoff, F., Lin, P., Moor, J. and Weckert, J. (Eds.). *Nanoethics*. Wiley, 2007.

understanding of both the general frameworks and specific issues that define the fields of information and computer ethics.

ACKNOWLEDGMENTS

The editors would like to acknowledge the support they received from their respective institutions while composing the *Handbook*. Kenneth Himma's work on this project was partially supported by Seattle Pacific University through a Faculty Research Grant, which released him from teaching duties and made it possible for him to devote most of his efforts to this project. Herman Tavani also received institutional support in the form of a Summer Faculty Research and Professional Development Grant from Rivier College, during the summer of 2006, to work on the *Handbook*. The editors are very grateful to Seattle Pacific University and Rivier College, respectively, for the institutional support they received.

The editors are especially grateful to the contributing authors, without whom this volume would not exist. The contributors' willingness to revise drafts of their papers to comply with the specific objectives of this handbook is greatly appreciated. We also appreciate the extraordinary patience, as well as the ongoing cooperation and support, the contributors displayed throughout the long, and sometimes tedious, process required to complete this book.

We are also grateful to the editorial staff at Wiley, especially to Paul Petralia, Anastasia Wasko, and Whitney Lesch, for managing to keep the book on a reasonable schedule, despite some of the obstacles that we encountered along the way.

Finally, we wish to thank our spouses, and our families, for their unwavering support throughout this project. To them, we dedicate this book.

*K. E. H.
H. T. T.
August, 2007*

Contributors

Alison Adam, PhD, is Professor of Information Systems and Director of the Informatics Research Institute at the University of Salford, UK. Her recent publications include *Gender, Ethics and Information Technology* (Palgrave Macmillan, 2005).

Yeslam Al-Saggaf, PhD, is a Senior Lecturer in Information Technology at Charles Sturt University and a Research Fellow at the Centre for Applied Philosophy and Public Ethics. His research interests lie in the areas of online communities (both social and political) and the online political public sphere in the Arab world.

Alan Borning, PhD, is Professor in the Department of Computer Science and Engineering at the University of Washington, adjunct professor in the Information School, and Co-Director of the Center for Urban Simulation and Policy Analysis. His current research interests are in human–computer interaction and designing for human values, particularly as applied to land use, transportation, and environmental modeling.

Maria Canellopoulou-Bottis, PhD, is a Lecturer at the Information Science Department of the Ionian University, Greece. Her recent publications include *The Legal Protection of Databases* (2004) and *Information Law* (2004), in Greek, and numerous articles in Greek and foreign journals.

Philip Brey, PhD, is Professor of Philosophy and Director of the Center for Philosophy of Technology and Engineering Science at the University of Twente, The Netherlands. He is a member of the board of the International Society for Ethics and Information Technology and the author of numerous articles in philosophy of technology and computer and information ethics.

Elizabeth A. Buchanan, PhD, is Associate Professor and Director, Center for Information Policy Research, School of Information Studies, University of Wisconsin-Milwaukee. She is Co-Director of the International Society for Ethics and Information Technology (INSEIT), Chair, Ethics Working Group, Association of Internet Researchers (AoIR), and Chair, Intellectual Freedom Round Table, Wisconsin Library Association.

Terrell Ward Bynum, PhD, is Professor of Philosophy at Southern Connecticut State University and Director of the Research Center for Computing and Society. His recent publications include *Computer Ethics and Professional Responsibility* (Blackwell, 2004), coedited with Simon Rogerson, and *Cyberphilosophy: The*

Intersection of Philosophy and Computing (Blackwell, 2002), coedited with James Moor.

Rafael Capurro, PhD, is Professor of Information Science and Information Ethics at Stuttgart Media University (Germany) and Director of the International Center for Information Ethics (ICIE). His recent publications include *Localizing the Internet: Ethical Aspects in Intercultural Perspective* (Fink Munich, 2007), coedited with J. Fruehbauer and T. Hausmanninger, as well as numerous book chapters and journal articles.

Tony Clear, is Associate Head of School in the School of Computing and Mathematical Sciences at Auckland University of Technology, New Zealand. He edits a regular column in the *ACM SIGCSE Bulletin*, is on the editorial board of *Computer Science Education*, and has research interests in software risk assessment.

Dorothy E. Denning, PhD, is Professor of Defense Analysis at the Naval Postgraduate School. She is the author of *Information Warfare and Security* (Addison Wesley, 1999) and of numerous articles and book chapters relating to conflict in cyberspace and information security.

Charles Ess, PhD, is Distinguished Research Professor and Professor of Philosophy and Religion at Drury University. His recent publications include *Information Technology Ethics: Cultural Perspectives*, coedited with Soraj Hongladarom (Idea Group, 2007), and special issues of *Ethics and Information Technology* devoted to cross-cultural approaches to privacy and to Kantian approaches to topics in information ethics.

Don Fallis, PhD, is Associate Professor of Information Resources and Adjunct Associate Professor of Philosophy at the University of Arizona. His articles have appeared in the *Journal of Philosophy*, *Philosophical Studies*, *Library Quarterly*, and the *Journal of the American Society for Information Science and Technology*.

Luciano Floridi, PhD, holds the research chair in philosophy of information at the Department of Philosophy of the University of Hertfordshire and is Fellow of St. Cross College, Oxford University. His books include the *Blackwell Guide to the Philosophy of Computing and Information* (2004) and *The Philosophy of Information* (Oxford University Press, forthcoming).

Batya Friedman, PhD, is Professor in the Information School, an Adjunct Professor in the Department of Computer Science & Engineering, and Co-Director of the Value Sensitive Design Research Lab at the University of Washington. Her recent publications include the development of an open source privacy addendum (UbiComp, 2006), the value-sensitive design of a corporation's groupware systems (GROUP, 2007), and numerous journal articles and book chapters.

Kenneth W. Goodman, PhD, is Associate Professor of Medicine and Philosophy at the University of Miami, where he directs the Bioethics Program. He has written extensively about ethics and health informatics, including hospital, public health, and genetics applications.

Don Gotterbarn, PhD, Director of the Software Engineering Ethics Research Institute at East Tennessee State University, has been active in computer ethics for more than 20 years. Most recently, his work has focused on ethical decision support methodologies.

Frances S. Grodzinsky, PhD, is Professor of Computer Science and Information Technology at Sacred Heart University and Co-Director of the Hersher Institute of Ethics. Her recent publications include numerous book chapters and journal articles.

Kenneth Einar Himma, PhD, JD, is Associate Professor of Philosophy at Seattle Pacific University and formerly taught at the University of Washington in the Information School, Law School, and Philosophy Department. He has published more than a hundred journal articles and is on the editorial boards of several journals on information technology and ethics.

Deborah G. Johnson, PhD, is the Anne Shirley Carter Olsson Professor of Applied Ethics and Chair of the Department of Science, Technology, and Society at the University of Virginia. Her anthology, *Technology & Society: Engineering our SocioTechnical Future* (coedited with J. Wetmore), is forthcoming from MIT Press in 2008, and she is currently working on the fourth edition of *Computer Ethics* (forthcoming from Prentice Hall).

Peter H. Kahn, Jr., PhD, is Associate Professor of Psychology at the University of Washington. His books include *The Human Relationship with Nature: Development and Culture* (MIT Press, 1999) and *Children and Nature: Psychological, Socio-cultural, and Evolutionary Investigations* (MIT Press, 2002), and his research publications have appeared in such journals as *Child Development*, *Developmental Psychology*, *Human-Computer Interaction*, and *Journal of Systems Software*.

Choon-Tuck Kwan is a Lecturer at the Auckland University of Technology (New Zealand) and Manager of the New-Zealand-based Software Engineering Practice Improvement Alliance. He was formerly a senior IT manager in a large governmental Statutory Board in Singapore.

David M. Levy, PhD, is Professor in the Information School of the University of Washington. He is the author of *Scrolling Forward: Making Sense of Documents in the Digital Age* (Arcade, 2001).

Antonio Marturano, PhD, an Adjunct Professor of Business Ethics at the Faculty of Economics, Sacred Heart Catholic University of Rome, has held several academic posts at universities in the United States, United Kingdom, and Italy. His main research area is applied ethics, with a special focus on ethical and legal problems spanning genetics and information technology.

Kay Mathiesen, PhD, teaches courses on information ethics and policy at the School of Information Resources and Library Science, University of Arizona. Her articles have appeared in journals such as *Library Quarterly*, *Computers and Society*, the *Annual Review of Law and Ethics*, and *Business Ethics Quarterly*.

Keith W. Miller, PhD, is Professor of Computer Science at the University of Illinois at Springfield and Editor of *IEEE Technology and Society Magazine*. His research interests include computer ethics, software testing, and computer science education.

James H. Moor, PhD, is Professor of Philosophy at Dartmouth College, an Adjunct Professor with the Centre for Applied Philosophy and Public Ethics at The Australian National University, and President of the International Society for Ethics and Information Technology. His ethical writings are on computer ethics, artificial intelligence, and nanotechnology.

Adam D. Moore, PhD, is Associate Professor in the Philosophy Department and the Information School at the University of Washington. He is the author of *Intellectual Property and Information Control* (Transaction Pub. University, hardback 2001, paperback 2004), and editor of *Intellectual Property: Moral, Legal, and International Dilemmas* (Rowman and Littlefield, 1997) and *Information Ethics: Privacy, Property, and Power* (The University of Washington Press, 2005).

John Snapper, PhD, is Associate Professor of Philosophy and an Associate of the Center for the Study of Ethics in the Professions. He is coeditor of *Owning Scientific and Technical Information* (Rutgers Press, 1989) and *Ethical Issues in the Use of Computers* (Wadsworth, 1985) and author of a numerous journal articles on related subjects.

Richard A. Spinello, PhD, is Associate Research Professor in the Carroll School of Management at Boston College. He has written and edited seven books on ethics and public policy, including *CyberEthics: Morality and Law in Cyberspace* (Jones and Bartlett, third edition, 2006) and *Intellectual Property Rights in a Networked World* (Idea Group, 2005).

Bernd Carsten Stahl, PhD, is Reader in Critical Research in Technology in the Centre for Computing and Social Responsibility at De Montfort University, Leicester, UK. As the Editor-in-Chief of the *International Journal of Technology and Human Interaction*, his interests cover philosophical issues arising from the intersections of business, technology, and information.

Herman T. Tavani, PhD, is Professor of Philosophy at Rivier College, a Lecturer in the Carroll School of Management at Boston College, and a visiting scholar/ethicist in the Department of Environmental Health at the Harvard School of Public Health. His recent books include *Ethics and Technology* (Wiley, second edition 2007) and *Ethics, Computing, and Genomics* (Jones and Bartlett, 2006).

Jeroen van den Hoven, PhD, is Professor of Moral Philosophy at Delft University of Technology (the Netherlands). He is the Editor-in-Chief of *Ethics and Information Technology* (Springer), Scientific Director of the Centre of Excellence for Ethics and Technology of the three technical universities in the Netherlands, and a member of the High Level Advisory Group on ICT (ISTAG) of the European Commission in Brussels.

Anton Vedder, PhD, is Associate Professor of Ethics and Law at the Tilburg Institute for Law, Technology, and Society of Tilburg University (the Netherlands). His recent publications include *NGO Involvement in International Governance and Policy: Sources of Legitimacy* (Martinus Nijhoff, 2007) and several book chapters and journal articles on privacy, reliability of information, accountability, and legitimacy of newly emerging governance regimes.

Kathleen A. Wallace, PhD, is Professor of Philosophy at Hofstra University. Her recent publications include “Educating for Autonomy: Identity and Intersectional Selves,” in *Education for a Democratic Society* (Rodopi Press, 2006), “Moral Reform, Moral Disagreement and Abortion” (*Metaphilosophy*, 2007), and “Morality and the Capacity for Symbolic Cognition,” *Moral Psychology* (MIT Press, 2007).

John Weckert, PhD, is Professor of Computer Ethics and Professorial Fellow at the Centre for Applied Philosophy and Public Ethics, Charles Sturt University, Australia. He is founding editor-in-chief of the journal *Nanoethics: Ethics for Technologies that Converge at the Nanoscale*, and author of numerous book chapters and journal articles.

Marty J. Wolf, PhD, is Professor of Computer Science and the Computer Science Program Coordinator at Bemidji State University in Minnesota. He has over 15 years experience using and administering Linux and has published numerous book chapters and journal articles in areas ranging from graph theory to computer ethics.

INTRODUCTION

KENNETH EINAR HIMMA and HERMAN T. TAVANI

As noted in the Preface to this volume, *The Handbook of Information and Computer Ethics* covers a wide range of topics and issues. The 27 chapters that comprise this work are organized into six main parts: I. Foundational Issues and Methodological Frameworks; II. Theoretical Issues Affecting Property, Privacy, Anonymity, and Security; III. Professional Issues and the Information-Related Professions; IV. Responsibility Issues and Risk Assessment; V. Regulatory Issues and Challenges; and VI. Access and Equity Issues.

I FOUNDATIONAL ISSUES AND METHODOLOGICAL FRAMEWORKS

Part I, comprising four chapters, opens with Luciano Floridi's examination of some key foundational concepts in information ethics. Floridi points out that the expression "information ethics," introduced in the 1980s, was originally used as a general label to discuss issues regarding information (or data) confidentiality, reliability, quality, and usage. He also notes that "information ethics" has since come to mean different things to different researchers working in a variety of disciplines, including computer ethics, business ethics, medical ethics, computer science, the philosophy of information, and library and information science. Floridi is perhaps best known among computer ethicists for his influential methodological (and metaethical) framework, which he calls *Information Ethics* or *IE*. He contrasts his framework with traditional views that have tended to view IE as either an "ethics of informational resources," an "ethics of informational products," or an "ethics of the informational environment." Floridi argues that his alternative view of IE, as a "macroethics," is superior to the various microethical analyses of IE that have been suggested.

Floridi's discussion of foundational issues in IE is followed by Terrell Ward Bynum's chapter, "Milestones in the History of Information Ethics." Bynum is generally considered to be one of the "pioneers" in computer ethics, helping to establish the field as an independent area of applied ethics in the 1980s. In Chapter 2, Bynum argues that the origin of computer and information ethics can be traced to the work of philosopher/scientist Norbert Wiener, who, during World War II, worked with a group of scientists and engineers on the invention of digital computers and radar. His chapter begins with a discussion of Wiener's "powerful foundation" for information

and computer ethics, and then it describes a number of additional “milestones” in the history of what Bynum describes as a “new and vital branch of ethics.”

Next, Jeroen van den Hoven examines some methodological issues in his chapter, “Moral Methodology and Information Technology.” One question that has been considered by some theoreticians in the fields of information and computer ethics is whether a new and distinct methodology is needed to handle the kinds of ethical issues that have been generated. Van den Hoven suggests that we need a methodology that is “different from what we have seen thus far in applied ethics,” but which does not call for “cataclysmic re-conceptualizations.” He begins with an overview of some of the main methodological positions in applied ethics that are relevant for computer ethics, before sketching out his proposed method that aims at making moral values a part of technological design in the early stages of its development. This method assumes, as van den Hoven notes, that “human values, norms, moral considerations can be imparted to the things we make and use (technical artefacts, policy, laws and regulation, institutions, incentive structures, plans).”

Part I closes with Batya Friedman, Peter Kahn, and Alan Borning’s chapter, “Value Sensitive Design and Information Systems.” The authors note that *value sensitive design* (VSD) is a theoretically grounded approach to the design of technology that accounts for human values in a “principled and comprehensive manner throughout the design process.” It also includes a tripartite methodology, consisting of conceptual, empirical, and technical investigations. In explicating VSD, Friedman, Kahn, and Borning consider three case studies: one concerning information and control of web browser cookies (implicating the value of informed consent); a second study concerning using high-definition plasma displays in an office environment to provide a “window to the outside world” (implicating the values of physical and psychological well-being and privacy in public spaces); and a third study concerning an integrated land use, transportation, and environmental simulation system to support public deliberation and debate on major land use and transportation decisions (implicating the values of fairness, accountability, and support for the democratic process). In the concluding section of their chapter, the authors offer some practical suggestions for how to engage in VSD.

II THEORETICAL ISSUES AFFECTING PROPERTY, PRIVACY, ANONYMITY, AND SECURITY

Part II comprises four chapters that examine conceptual and theoretical frameworks in information ethics. Unlike the chapters in Part I, however, they examine some topic- or theme-specific frameworks that underlie many of the practical issues considered in the remaining parts of the Handbook. Specifically, the chapters in Part II examine theoretical and conceptual aspects of intellectual property, informational privacy, online anonymity, and cyber security. In the opening chapter, Adam Moore discusses three different kinds of justifications for intellectual property (IP), also noting that we need to be careful not to confuse moral claims involving IP with legal ones. His chapter begins with a brief sketch of Anglo-American and Continental systems of IP that

focuses on legal conceptions and rights. Moore then examines arguments for the personality-based, utilitarian, and Lockean views of property. He concludes that there are justified moral claims to intellectual works, that is, “claims that are strong enough to warrant legal protection.”

Moore’s analysis of IP is followed by Herman Tavani’s examination of some key concepts, theories, and controversies affecting informational privacy. Beginning with an overview of the concept of privacy in general, Tavani distinguishes among four distinct kinds of privacy: physical, decisional, psychological, and informational privacy. He then evaluates some classic and contemporary theories of informational privacy before considering the impact that some specific information technologies (such as cookies, data mining, and RFID technologies) have had on four subcategories of informational privacy: consumer privacy, medical privacy, employee privacy, and location privacy. His chapter closes with a brief examination of some recent proposals for framing a comprehensive informational-privacy policy.

Next, Kathleen Wallace examines the concept of anonymity in her chapter, “Online Anonymity.” Wallace points out that anonymity and privacy are closely related, with anonymity “being one means of ensuring privacy.” She also notes that anonymity can be brought about in a variety of ways and that there are many purposes, both positive and negative, that anonymity could serve. For example, on the positive side, it can promote free expression and exchange of ideas, and it can protect someone from undesirable publicity. On the negative side, however, anonymity can facilitate hate speech with no accountability, as well as fraud or other criminal activity. Wallace believes that there are two thoughts regarding anonymity as a “byproduct” that are worth distinguishing; it could be the “byproduct of sheer size as when one is among a throng of people who don’t know one another” or the “byproduct of complex social organization.”

Part II concludes with Kenneth Himma’s chapter, “Ethical Issues Involving Computer Security: Hacking, Hacktivism, and Counterhacking.” Himma considers whether and to what extent various types of unauthorized computer intrusions by private persons and groups (as opposed to state agents and agencies) are morally permissible. After articulating a *prima facie* general case against these intrusions, Himma considers intrusions motivated by malicious intentions and by certain benign intentions, such as the intent to expose security vulnerabilities. The final sections of his chapter consider controversies associated with “hacktivism” and “counterhacking” (or hack backs). Himma’s chapter can also be read in connection with Dorothy Denning’s chapter on the ethics of cyber conflict.

III PROFESSIONAL ISSUES AND THE INFORMATION-RELATED PROFESSIONS

Part III comprises five chapters that examine a diverse set of professional-ethics issues affecting the information and information-related professions—for example, concerns that affect library professionals, software engineering/development professionals, (online) research professionals, medical and healthcare professionals, and business professionals. It opens with Kay Mathiesen and Don Fallis’ chapter, “Information

Ethics and the Library Profession.” Mathiesen and Fallis note that, in general, the role of the professional librarian is to provide access to information, but they also point out that librarians vary in their activities depending on the goal of such access, and on whether they are corporate librarians, academic librarians, or public librarians. The authors begin their analysis by considering the “mission” of the librarian as an “information provider” and then focus on some of the issues that arise in relation to “the role of the librarian as an information provider.” In particular, the authors focus on questions pertaining to the “selection and organization of information,” which, in turn, raises concerns having to do with “bias, neutrality, advocacy, and children’s rights to access information.”

Mathiesen’s and Fallis’s analysis of ethical challenges facing librarians and the library profession is followed by an examination of controversies affecting open source software development and the computing profession in Frances Grodzinsky’s and Marty Wolf’s chapter, “Ethical Interest in Free and Open Source Software.” Grodzinsky and Wolf begin by comparing free software (FS) and open source software (OSS), and by examining the history, philosophy, and development of each. Next, they explore some important issues that affect the ethical interests of all who use and are subject to the influences of software, regardless of whether that software is FS or OSS. The authors also argue that the distinction between FS and OSS is one that is philosophically and socially important. Additionally, they review some issues affecting the autonomy of OSS software developers and their “unusual professional responsibilities.”

Next, Elizabeth Buchanan and Charles Ess examine some professional-ethical issues affecting online research in their chapter, “Internet Research Ethics: The Field and its Critical Issues.” Buchanan and Ess begin by noting that Internet research ethics (IRE) is an emerging multi- and interdisciplinary field that systematically studies the ethical implications that arise from the use of the Internet as “a space or locale of, and/or tool for, research.” The authors believe that no one discipline can claim IRE as its own. Because Internet research is undertaken from a wide range of disciplines, they argue that IRE builds on the research ethics traditions developed for medical, humanistic, and social science research. For Buchanan and Ess, a “central challenge for IRE is to develop guidelines for ethical research that aim toward objective, universally recognized norms, while simultaneously incorporating important disciplinary differences in research ethics.” The authors consider and review a range of the most common ethical issues in IRE, and they offer some suggestions for possible resolutions of specific ethical challenges.

Buchanan and Ess’s analysis of IRE-related ethical issues is followed by Kenneth Goodman’s chapter, “Health Information Technology: Challenges in Ethics, Science, and Uncertainty.” Goodman notes that the use of information technology in the health professions has introduced numerous ethical issues and professional challenges. The three principal issues that Goodman examines in the context of these challenges are (1) privacy and confidentiality; (2) the use of decision support systems; and (3) the development of personal health records.

Part III closes with Bernd Carsten Stahl’s examination of some business-related ethical concerns in his chapter, “Ethical Issues of Information and Business.” Stahl

begins his analysis with a brief definition of the concept of business and then discusses some specific business-ethics issues affecting privacy/employee surveillance, intellectual property, globalization, and digital divides. He considers various approaches to these and related business-ethical issues, drawing on some of the debates in computer and information ethics. Stahl notes that in these debates, different “sets of ethical discourse” have been used. He also notes that in some instances, these “ethical discourses” overlap and have “the potential to inform each other.” Stahl’s chapter aims at establishing a link between these discourses.

IV RESPONSIBILITY ISSUES AND RISK ASSESSMENT

The five chapters that make up Part IV examine a wide range of topics, each of which touches on one or more aspects of responsibility and risk involving information technology. In the opening chapter, “Responsibilities for Information on the Internet,” Anton Vedder begins by noting that issues involving responsibility for Internet service providers (ISPs) are much broader in scope than they are sometimes portrayed in the research literature, where the emphasis has tended to be more narrowly on concerns affecting accountability with regard to illegal content. He then examines some issues affecting the responsibilities involved in the possible negative impact of “the dissemination of information” on the Internet. Here, he focuses mainly on three parties: (1) those who put forward information on the Internet, that is, the *content providers*; (2) the organizations that provide the infrastructure for the dissemination of that information — the *ISPs*; and (3) the receivers or users of the information, that is, the *third parties*.

Vedder’s analysis of responsibility for the dissemination of information on the Internet is followed by Philip Brey’s chapter, “Virtual Reality and Computer Simulation.” Brey argues that virtual reality and computer simulation have not received much attention from ethicists, including ethicists in the computing profession, and that this relative neglect is unjustified because of the important ethical questions that arise. He begins his chapter by describing what virtual reality and computer simulations are and then describes some current applications of these technologies. Brey then discusses the ethics of three distinct aspects of virtual reality: (1) representation in virtual reality and computer simulations, (2) behavior in virtual reality, and (3) computer games. He concludes with a discussion of issues affecting responsibility, such as, responsibility in the development and professional use of virtual reality systems and computer simulations.

Next, Antonio Marturano examines some issues in genetic research that overlap with questions in information ethics. In his chapter, “Genetic Information: Epistemological and Ethical Issues,” Marturano first analyzes some basic information-related concepts of molecular biology and then considers the ethical consequences of their misuse. He notes that genetics has utilized many concepts from informatics and that these concepts are used in genetics at different, but related, levels. At the most basic level, for example, genetics has taken the very notion of *information* — central to the field of informatics — to explain the mechanisms of life. Marturano notes that some

authors have questioned the application of informational concepts in genetics. He also believes that it is important to understand the way the information-related concepts of molecular biology are interpreted to understand the reason why their “incorrect application—and consequent rhetorical use by geneticists—turns into an ethical failure.” In this sense, Marturano’s chapter is also concerned with issues affecting responsibility and the use of informational concepts.

In the next chapter, Dorothy Denning examines some ethical aspects of “cyber conflict.” Denning believes that there are three areas of cyber conflict where the ethical issues are problematic. The first is “cyber warfare at the state level,” when conducted in the interests of national security. One of the questions raised in this context is whether it is ethical for a state to penetrate or disable the computer systems of an adversary state that has threatened its territorial or political integrity. The second area involves “nonstate actors,” whose cyber attacks are politically or socially motivated. This domain of conflict is often referred to as “hacktivism,” the convergence of hacking with activism. Denning notes that if the attacks are designed to be “sufficiently destructive as to severely harm and terrorize civilians,” they become “cyberterrorism” — the integration of cyber attacks with terrorism. The third area involves the “ethics of cyber defense,” particularly what is called “hack back,” “strike back,” or “active response.” If a system is under cyber attack, can the system administrators attack back to stop it? What if the attack is coming from computers that may themselves be victims of compromise? Since many attacks are routed through chains of “compromised machines,” can a victim “hack back” along the chain to determine the source? Denning’s chapter, which raises questions about responsibility and risk issues affecting cyber conflict, can also be read in conjunction with Ken Himma’s analysis of security-related issues in Chapter 8.

In the closing chapter of Part V, “A Practical Mechanism for Ethical Risk Assessment—A SoDIS Inspection,” Don Gotterbarn, Tony Clear, and Choon-Tuck Kwan examine some specific issues and concerns involving risk analysis. The authors begin by noting that although the need for high quality software may be obvious, information systems are “frequently plagued by problems that continue to occur in spite of a considerable amount of attention to the development and applications of certain forms of risk assessment.” They claim that the narrow form of risk analysis that has been used, with its limited understanding of the scope of a software project and information systems, has contributed to significant software failures. Next, the authors introduce an expanded risk analysis process, which goes beyond the concept of “information system risk” to include social, professional, and ethical risks that lead to software failure. They point out that using an expanded risk analysis will enlarge the project scope considered by software developers.

V REGULATORY ISSUES AND CHALLENGES

Part V includes five chapters that examine a diverse set of issues and challenges affecting the regulation of information. It opens with John Weckert and Yeslam Al-Saggaf’s chapter, “Regulation and Governance on the Internet,” which raises the