

Contents

<i>Preface</i>	ix
1. What You Will Find in This Book?	1
1.1 The Point of Departure: Observations	1
1.2 The Mission: Targets and Objectives	4
1.3 The Way Ahead: Overview of the Chapters	6
1.4 The Origin: Background	10
2. Life and Technology as Conceptual Patterns	13
2.1 Life	14
2.2 Technology	20
2.3 Uncharted Territory: Life and Technology at a Crossroads	28
3. Ethics Guiding Our Pathways to the Future	35
3.1 Problem-Oriented Ethics	36
3.1.1 Ethics for Analyzing and Resolving Moral Conflicts	36
3.1.2 Standard Situations in a Moral Respect	39
3.1.3 Beyond Standard Situations in a Moral Respect	42
3.2 Ethics for Guiding the Techno-Scientific Advance	45
3.3 Ethics of Responsibility	49
3.3.1 The Understanding of Responsibility	50
3.3.2 Consequentialist Ethics of Technology	53
3.3.3 Responsibility Beyond Consequentialism	56
4. On the Track to Creating Life: Synthetic Biology	61
4.1 Synthetic Biology	62
4.2 The Debate on the Opportunities and Risks of Synthetic Biology	68
4.2.1 Studies on the Opportunities and Risks of Synthetic Biology	69

4.2.2	Overview of Opportunities	72
4.2.3	Categorization of Risks	74
4.3	Ethical Challenges	79
4.3.1	Risks of Self-Organizing Products of Synthetic Biology	80
4.3.2	The Moral Status of Created Organisms	86
4.3.3	Human Hubris by “Playing God”?	89
4.4	Responsibility Configurations of Synthetic Biology	94
4.5	Beyond Ethics: Visionary Narratives Around the Notion of “Life”	101
5.	Animal Enhancement for Human Purposes	107
5.1	Technologies for Intervening into Animals	108
5.2	The Semantics of Animal Enhancement	113
5.3	Normative Frameworks and Ethical Challenges	117
5.3.1	Between Human Purposes and Animal Welfare	118
5.3.2	Ethical Spotlights on Animal Enhancement	122
5.4	Responsibility Considerations	129
5.5	Beyond Ethics: Changing Human–Animal Relationships	133
6.	Shaping the Code of Human Life: Genome Editing	137
6.1	Editing Humans? The Case of the Chinese Twins	138
6.2	Genome Editing: Turbo Genetic Engineering	142
6.3	Ethical Issues of Human Genome Editing	147
6.3.1	The Consequentialist View of Germline Intervention	148
6.3.2	Deontological Arguments	155
6.4	Responsibility Challenges of Germline Intervention	158
6.5	Genome Editing: Editing Humans?	166
7.	Human Enhancement	169
7.1	Technologies for Human Enhancement	169
7.1.1	Converging Technologies for Improving Human Performance	170

7.1.2	Visions of Human Enhancement	174
7.1.3	Enhancement in Human History	180
7.2	The Semantics of Human Enhancement	183
7.2.1	Enhancement <i>versus</i> Healing	183
7.2.2	The Semantic Field of Healing, Weak and Strong Enhancement	187
7.2.3	Human Enhancement by Technology	192
7.3	Ethics of Human Enhancement	195
7.3.1	Normative Uncertainties and Ethical Questions	195
7.3.2	Ethical Argumentation Patterns	199
7.3.3	Balance of the Ethical Debate So Far	206
7.4	Are We Heading Toward an “Enhancement Society”?	209
7.5	Responsible Human Enhancement	216
7.5.1	Responsibility Constellation	217
7.5.2	The Case of Neuro-Electric Enhancement	221
7.6	Changing Relations Between Humans and Technology	225
8.	Robots and Artificial Intelligence: Living Technology?	229
8.1	Artificial Companions	230
8.2	Autonomous Technologies	235
8.2.1	Autonomous Technology in Practice Fields	237
8.2.2	Autonomous Problem-Solving and Machine Learning	242
8.3	Ethical Issues	246
8.3.1	Ethical Dilemma Situations	247
8.3.2	Adaptation and Control	250
8.3.3	The Moral Status of Autonomous Technology	255
8.4	Responsibility Considerations	259
8.4.1	Responsibility Assignment to Autonomous Technology?	259
8.4.2	Human Responsibility for Autonomous Technology	267
8.5	Autonomous Technology: Loss of Human Autonomy?	270

9. On the Future of Life	277
9.1 The Ultimate Triumph of the Baconian <i>Homo Faber?</i>	278
9.2 The End of Nature (1): Human Impact on the Future of Life	281
9.3 The End of Nature (2): Dominance of the Techno-Perspective	284
9.4 Does Autonomous Technology Live?	288
9.5 Moral Status for Engineered and Created "Life"	293
9.6 The Ladder of "Life"	298
 <i>Bibliography</i>	 305
 <i>Index</i>	 337