Contents

- Notes on contributors, xi
- Series preface, xix
- Preface, xxi
- 1 New directions in forensic anthropology, 1 *Douglas H. Ubelaker*
 - 1.1 Introduction, 1
 - 1.2 Detection and recovery, 3
 - 1.3 Determination of human status, 4
 - 1.4 Age at death, 6
 - 1.5 Time since death, 7
 - 1.6 Sex estimation, 8
 - 1.7 Ancestry, 9
 - 1.8 Living stature, 9
 - 1.9 Postmortem history, 10
 - 1.10 Positive identification, 10
 - 1.11 Foul play, 11
 - 1.12 Certification, 12
 - 1.13 Conclusion, 13 Acknowledgments, 14 References, 14
- **2** Some thoughts on the future challenges to criminalistics, 19 *Ronald L. Singer*
 - 2.1 Introduction, 19
 - 2.2 Technological advances, 20
 - 2.2.1 Computers, software, and databases, 20
 - 2.2.2 DNA, 21
 - 2.2.3 Impression evidence, 21
 - 2.2.4 Instrumentation, 22
 - 2.3 Quality issues, 23
 - 2.3.1 NAS Report, 23

- 2.4 Financial burdens, 24
 - 2.4.1 Seeking additional sources of grant funding, 25
 - 2.4.2 Staffing, 25
 - 2.4.3 Regionalization, 26
 - 2.4.4 Consolidation, 26
 - 2.4.5 Cost recovery, 27
 - 2.4.6 Privatization, 28
 - Acknowledgments, 29
 - References, 29
- **3** Digital and multimedia sciences, 31 *Zeno Geradts*
 - 3.1 Introduction, 31
 - 3.2 History, 33
 - 3.3 Digital evidence, 35
 - 3.4 Damaged (mobile) devices, 37
 - 3.5 Multimedia, 38
 - 3.5.1 Deep learning (Hinton et al. 2006), 39
 - 3.5.2 Camera identification, 40
 - 3.5.3 Other biometrics, 41
 - 3.6 Wearables and quantified self, 41
 - 3.7 Drones, 41
 - 3.8 Sensors, 42
 - 3.9 Geo satellites, 42
 - 3.10 Disasters/large scale incidents, 42
 - 3.11 Quality assurance, 43
 - 3.12 Challenges, 43 References, 44
- **4** A look at the future of forensic engineering science, 49 *Thomas L. Bohan*

"The future": a preface, 49

- 4.1 Junk law in the courtroom, 50
- 4.2 Forensic engineering sciences and needs of the modern world at large, 55Acknowledgments, 58References, 58

- **5** General section history: look at two disciplines and a review of standards, certifications, and education, 61 *John E. Gerns*
 - 5.1 Introduction, 61
 - 5.2 Forensic veterinary science, 62
 - 5.3 Certification: introduction, 66
 - 5.4 Certification—ABMDI, 66
 - 5.5 Standards evolution—OSAC, 68
 - 5.6 Standard evolution—ASB, 69
 - 5.7 Education accreditation, 70
 - 5.8 Summary, 71 Acknowledgements, 72 References, 72
- **6** The future of forensic science: hot leads in contemporary forensic research: Jurisprudence, 73 *Carol Henderson*
 - 6.1 Daubert's history, 75
 - 6.2 The *Daubert* test, 77
 - 6.3 Questions raised by *Daubert*, 77
 - 6.4 The NAS report, 78
 - 6.5 The national commission on forensic science and the organization of scientific area committees, 80
 - 6.6 NCFS, 80
 - 6.7 OSAC, 82
 - 6.8 The path forward for judicial and legal education in forensic science, 84Acknowledgments, 87References, 87
- **7** Forensic odontology, 91

Robert E. Barsley

- 7.1 Introduction, 91
- 7.2 Roles of the forensic odontologist, 92
- 7.3 Current considerations, 94
- 7.4 Identification by teeth, 96
- 7.5 Dental age assessment, 104
- 7.6 Bitemarks, 105

- 7.7 Abuse and negligence, 107
- 7.8 Closing, 107
- **8** Opportunities and problems faced in forensic pathology, 109 *Edmund R. Donoghue*
 - 8.1 Opportunity: radiology technology and computer imaging, 109
 - 8.2 Threat: dropping forensic pathology training requirement for anatomic pathology, 110
 - 8.3 Threat: maintenance of certification could see some forensic pathologists unemployed, 111
 - 8.4 Threat: standards are becoming increasingly detailed and rigorous, 112
 - 8.5 Threat: forensic: overregulation by federal government and other entities, 112
 - 8.6 Conclusion, 112
- **9** The future of forensic psychiatry and behavioral science, 113 *Richard Rosner*
 - 9.1 The BRAIN initiative, 114
 - 9.2 The law and the human mind, 114
 - 9.3 Correlation is NOT causation, 115
 - 9.4 Theories of consciousness, 115
 - 9.5 The hard problem of consciousness, 116
 - 9.6 Consciousness and the failure of the physical sciences, 117
 - 9.7 The problem of free will, 118
 - 9.8 The bottom line, 119 References, 119
- **10** The future of forensic document examination, 121 *John L. Sang, Linton A. Mohammed and Carl R. McClary*
 - 10.1 What is a forensic document examiner (FDE)?, 121
 - 10.2 Origins of questioned document examination, 123
 - 10.3 Albert S. Osborn and the formation of the American Society of Questioned Document Examiners (ASQDE), 125

10.4	Ordway Hilton and the formation of American
	Academy of Forensic Sciences (AAFS), 126
10.5	Questioned documents and the formation of the
	International Association of Forensic Sciences
	(IAFS), 128
10.6	Key issues, 128
	10.6.1 Certification, 128
	10.6.2 Standardization, 129
10.7	Standards of practice, 132
10.8	The Daubert standard and FDE, 135
10.9	How FDE meets Daubert, 137
	10.9.1 Standards, 137
	10.9.2 Error rate/reliability, 138
	10.9.3 Testing of basic principles, 139
	10.9.4 Peer review and publication, 142
	10.9.5 General acceptance in the forensic
	community, 143
10.10	Research in FDE, 144
	10.10.1 Neuroscience, 144
	10.10.2 Eye tracking, 146
10.11	Signature and handwriting verification
	systems, 148
10.12	Automation in the forensic examination of
	handwriting, 148
10.13	Current research, 149
10.14	Conclusion, 150
	10.14.1 The public and how law and forensics will
	be shaped, 150
	10.14.2 Research, 151
	10.14.3 Research in other document
	examinations, 151
	References, 152
	Further readings, 155
	Measurement science and standards in forensic
	handwriting analysis – U.S. Commerce Department's
	National Institute of Standards and Technology
	(NIST) Symposium, June 2013 presentations, 157

- **11** Past perspectives and future directions in forensic toxicology, 159 *Barry K. Logan F-ABFT*
 - 11.1 Our history, 159
 - 11.2 Reflections on factors affecting our future direction, 163
 - 11.3 Facing forward, 167
 - 11.3.1 Laboratory resources and the role of the Federal Government, 168
 - 11.3.2 Standards development and harmonization of best practices, 168
 - 11.3.3 Technology, 169
 - 11.3.4 Training, research, and interdisciplinary collaboration, 171
 - 11.4 Conclusion, 173 Acknowledgments, 174

Index, 175