

# Table of contents

- **Editor's Preface** (p. vii)
- **Preface** (p. ix)
- **Acknowledgments** (p. xi)
- **Introduction** (p. 1)
- **1 Laboratory Design** (p. 3)
- **International Overview** (p. 3)
- **Site Planning** (p. 14)
- **Exterior Image** (p. 17)
- **Public Spaces** (p. 21)
- **The Lab Module-Basis for Laboratory Design** (p. 23)
- **Flexibility** (p. 26)
- **Core Labs** (p. 32)
- **Biosafety Level Labs** (p. 34)
- **Research Biocontainment Security** (p. 36)
- **Safety, Security, and Regulations** (p. 38)
- **2 Research Facility Programming** (p. 47)
- **Programming Definition and Key Terms** (p. 47)
- **The Programming Process** (p. 51)
- **Programming Tools** (p. 75)
- **Benchmarking** (p. 85)
- **Key Cost Factors** (p. 88)
- **Contracting Methods** (p. 91)
- **3 Teaching Laboratories** (p. 95)
- **Building Community through Science** (p. 95)
- **4 Sustainable Design** (p. 107)
- **The Case for Green Labs and LEED (Leadership in Energy and Environmental Design)** (p. 107)
- **Sustainable Design Strategies** (p. 111)
- **Green Chemistry** (p. 115)
- **Trends in Optimizing Laboratory Energy Use** (p. 118)
- **Case Study: Lehman College New Science Facility** (p. 127)
- **5 Interior Design** (p. 133)
- **Reception and Lobby** (p. 133)
- **Conference Rooms** (p. 134)
- **Lounges and Break Rooms** (p. 136)
- **Corridors** (p. 137)
- **Elevators and Stairs** (p. 141)
- **Research Labs** (p. 142)
- **Offices** (p. 143)
- **Interior Finishes** (p. 146)
- **Wayfinding** (p. 148)
- **6 Laboratory Furnishings and Equipment** (p. 153)
- **Trends in Laboratory Furnishings** (p. 153)
- **Fume Hoods** (p. 164)

- **Specialized Equipment and Equipment Spaces** (p. 170)
- **7 Engineering Design Issues** (p. 177)
- **Structural Systems** (p. 177)
- **Mechanical Systems-General Design Issues** (p. 183)
- **Fume Hoods-Mechanical System Design Issues** (p. 204)
- **Electrical Systems** (p. 206)
- **Lighting Design** (p. 209)
- **Telephone and Data System** (p. 215)
- **Information Technology** (p. 216)
- **Closets** (p. 218)
- **Plumbing Systems** (p. 218)
- **Commissioning** (p. 224)
- **Facility-Management Issues** (p. 227)
- **8 Renovations and Adaptive Reuse** (p. 229)
- **Renovation Types** (p. 230)
- **Operational Issues** (p. 230)
- **Budgeting** (p. 231)
- **Architectural Issues** (p. 231)
- **Mechanical, Electrical, and Plumbing Issues** (p. 233)
- **Decision-Making Process** (p. 235)
- **Quick-Start Guide to Renovations** (p. 235)
- **Case Studies** (p. 237)
- **Conclusion** (p. 249)
- **Illustration Credits** (p. 251)
- **Index** (p. 253)