Contents

Contributor biographies xv

Introduction xxix
Robert Frodeman

PART 1: THE TERRAIN OF KNOWLEDGE

1 A short history of knowledge formations 3
Peter Weingart

2 A taxonomy of interdisciplinarity 15
Julie Thompson Klein

3 Interdisciplinary cases and disciplinary knowledge 31
Wolfgang Krohn
Box: Prospects for a philosophy of interdisciplinarity 39
Jan C. Schmidt

4 Deviant interdisciplinarity 50
Steve Fuller

5 Against holism 65
Daniel Sarewitz

PART 2: INTERDISCIPLINARITY IN THE DISCIPLINES

6 Physical sciences 79
Robert P. Crease
Box: Mathematics and root interdisciplinarity 88
Erik Fisher and David Beltran-del-Rio

7 Integrating the social sciences: theoretical knowledge, methodological tools, and practical applications 103
Craig Calhoun and Diana Rhoten

8 Biological sciences 119
Warren Burggren, Kent Chapman, Bradley Keller, Michael Monticino, and John Torday
9 Art and music research
   Julie Thompson Klein and Richard Parnutt
10 Engineering
   Patricia J. Culligan and Feniosky Peha-Mora
11 Religious studies
   Sarah E. Fredericks
12 Information research on interdisciplinarity
   Carole L. Palmer
   Box: Transcending discipline-based library classifications
   Richard Szostak

PART 3: KNOWLEDGE INTERDISCIPLINED

13 A field of its own: the emergence of science and technology studies
   Sheila Jasanoff
14 Humanities and technology in the Information Age
   Cathy N. Davidson
   Box: Vectors: an interdisciplinary digital journal
   Tara McPherson
15 Media and communication
   Adam Briggle and Clifford G. Christians
16 Cognitive science
   Paul Thagard
17 Computation and simulation
   Johannes Lenhard
18 Interdisciplinarity in ethics and the ethics of interdisciplinarity
   Anne Balsamo and Carl Mitcham
19 Design as problem solving
   Prasad Boradkar
   Box: InnovationSpace at Arizona State University
   Prasad Boradkar
20 Learning to synthesize: the development of interdisciplinary understanding
   Veronica Boix Mansilla
   Box: ZiF
   Ipke Wachsmuth
   Box: Creativity and interdisciplinarity
   Thomas Kowall

PART 4: INSTITUTIONALIZING INTERDISCIPLINARITY

21 Evaluating interdisciplinary research
   Katri Huutoniemi
22 Peer review  
*J. Britt Holbrook*

23 Policy challenges and university reform  
*Clark A. Miller*

Box: Transdisciplinary efforts at public science agencies:  
NSF's SciSIP program  
*Erin Christine Moore*

24 Administering interdisciplinary programs  
*Beth A. Casey*

25 Undergraduate general education  
*William H. Newell*

Box: The Association for Integrative Studies  
*William H. Newell*

26 Interdisciplinary pedagogies in higher education  
*Deborah DeZure*

27 Facilitating interdisciplinary scholars  
*Stephanie Pfirman and Paula J. S. Martin*

28 Doctoral student and early career academic perspectives  
*Jessica K. Graybill and Vivek Shandas*

29 A memoir of an interdisciplinary career  
*Daniel Callahan*

**PART 5: KNOWLEDGE TRANSDISCIPLINED**

30 Solving problems through transdisciplinary research  
*Gertrude Hirsch Hadorn, Christian Pohl, and Gabriele Bammer*  
Box: td-net—the Swiss Academies of Arts and Sciences'  
forum for transdisciplinary research  
*Christian Pohl and Gertrude Hirsch Hadorn*  
Box: Sustainability foresight: participative approaches to  
sustainable utility sectors  
*Bernhard Truffer*

31 Systems thinking  
*Sytse Strijbos*

Box: Mapping interdisciplinary research  
*Katy Borner and Kevin W. Boyack*

32 Cross-disciplinary team science initiatives: research, training,  
and translation  
*Daniel Stokols, Kara L. Hall, Richard P. Moser, Annie X. Feng,  
Shalini Misra, and Brandie K. Taylor*  
Box: Managing consensus in interdisciplinary teams  
*Rico Defila and Antonietta Di Giulio*
33 The environment 494
J. Baird Callicott
Box: Biocultural conservation in Cape Horn: the Magellanic woodpecker as a charismatic species 499
Ximena Arango, Ricardo Rozzi, Francisca Massardo, and Jose Tomas Ibarra

34 Health sciences and health services 508
Jennifer L. Terpstra, Allan Best, David Abrams, and Gregg Moor
Box: Telehospice: a case study in healthcare intervention research 511
Elaine M. Wittenberg-Lyles, Debra Parker Oliver, and George Demiris

35 Law 522
Marilyn Averill

36 Risk 536
Sven Ove Hansson

37 Corporate innovation 546
Bruce A. Vojak, Raymond L. Price, and Abbie Griffin

Index 561