Computational Design Methods and Technologies: Applications in CAD, CAM, and CAE Education

Ning Gu
*University of Newcastle, Australia*

Xiangyu Wang
*Curtin University, Australia*
Table of Contents

Preface.............................................................................................................. xvii

Acknowledgment.......................................................................................... xxii

Chapter 1
Systems and Enablers: Modeling the Impact of Contemporary Computational Methods and Technologies on the Design Process........................................................................ 1
   Michael J. Ostwald, The University of Newcastle, Australia

Chapter 2
Novel Concepts in Digital Design .................................................................. 18
   Rivka Oxman, Technion - Israel Institute of Technology, Israel

Chapter 3
Slow Computing: Teaching Generative Design with Shape Grammars............... 34
   Terry Knight, Massachusetts Institute of Technology, USA

Chapter 4
Learning Parametric Designing ...................................................................... 56
   Marc Aurel Schnabel, The Chinese University of Hong Kong, Hong Kong

Chapter 5
Direct Building Manufacturing of Homes with Digital Fabrication....................... 71
   Lawrence Sass, Massachusetts Institute of Technology, USA

Chapter 6
Building Information Modeling and Professional Practice................................. 83
   Dennis R. Shelden, Massachusetts Institute of Technology, USA

Chapter 7
Advancing BIM in Academia: Explorations in Curricular Integration...................... 101
   Karen M. Kensek, University of Southern California, USA
Chapter 8
Applying BIM in Design Curriculum ........................................................................................................ 122
  Clark Cory, Purdue University, USA
  Shanna Schmelter-Morret, Holder Construction Company, USA

Chapter 9
Constructivist Learning Theory in Virtual Design Studios ........................................................................ 139
  Leman Figen Gul, TOBB University of Economics and Technology, Turkey
  Anthony Williams, University of Newcastle, Australia
  Ning Gu, University of Newcastle, Australia

Chapter 10
Understanding Collaborative Digital Media Design in the 3D CVE: A Vygotskian Approach .............. 163
  Theodor Wyeld, Flinders University, Australia
  Ekaterina Prasolova-Förlund, Norwegian University of Science and Technology, Norway

Chapter 11
Will Different Scales Impact on Design Collaboration in 3D Virtual Environments? .......................... 185
  Jerry Jen-Hung Tsai, University of Sydney, Australia
  Jeff Kan, Taylor's University, Malaysia
  Xiangyu Wang, Curtin University, Australia
  Yingstiu Huang, Tunghai University, Taiwan

Chapter 12
  Russell Lowe, University of New South Wales, Australia

Chapter 13
Augmented Reality Research for Architecture and Design ....................................................................... 225
  Mi Jeong Kim, Kyung Hee University, Korea
  Xiangyu Wang, Curtin University, Australia & Kyung Hee University, Republic of Korea
  Xingquan Zhu, University of Technology Sydney, Australia
  Shih-Chung Kang, Taiwan National University, Taiwan

Chapter 14
Experiencing Digital Design: Developing Interactive Workspaces for Visualizing, Editing, and Interacting with Digital Design Artifacts ......................................................................................... 238
  John I. Messner, The Pennsylvania State University, USA
  Robert M. Leicht, The Pennsylvania State University, USA

Chapter 15
Interactive Architecture: Spaces that Sense, Think, and Respond to Change ....................................... 257
  Taysheng Jeng, National Cheng Kung University, Taiwan