

Contents

Preface — V

About the editors — XI

Part I: Future cities

Marcela Silviano Brandão Lopes, Luciana Souza Bragança, Marcus Barbosa
Deusdedit, Mayumi Ikemura Amaral, and Natacha Rena

Biopotent social technology: occupations park and university extensions — 3

Bernhard Lenz and Roberto Zanetti Freire

Performance potentials: the optimization of buildings in operation — 21

Simon Schmidt and Klaus Peter Sedlbauer

**Climate culture building: comparison of different computer generated building
envelope designs for different Brazilian climate zones — 35**

Lia Mota, Ivan Lemos, Luiza Santos, and Renata Panseri

**Electrical energy efficiency in urban infrastructure systems: nonintrusive smart
meter for electrical energy consumption monitoring — 47**

Roberto Zanetti Freire, Bernhard Lenz, Gerson Henrique dos Santos, Joseph Virgone,
and Abdelkrim Trabelsi

**Distinct approaches to reproduce hygrothermal behavior of building materials
based black-box models — 61**

Part II: Modern urban agriculture

Sérgio Manuel Serra da Cruz, Anja Steglich, Pedro Vieira Cruz, and Ana Claudia
Macedo Vieira

**Investigating the challenges and opportunities of urban agriculture in global north
and global south countries — 95**

Milena Serafim

**Social technology and urban agriculture in Brazil: the social technology network
and the social technology DataBank project — 111**

Alessandra Pavesi

Orchards from the forest: Urban agriculture as a lab for multiple learning — 121

Part III: Renewable energy

Antonio Pralon F. Leite and Douglas B. Riffel

The challenges of the new energy revolution — 137

Christina S. Birkel

Synthesis of inorganic energy materials — 159

Part IV: Sustainable smart materials

Annelise Kopp Alves

Nature-inspired smart materials for multifunctional applications — 177

Michael Koerdt, Martina Hübner, Maryam Kahali Moghaddam, Walter Lang, and Axel Siegfried Herrmann

Smart fiber-reinforced polymer composites and their resource-efficient production by means of sensor integration — 191

Silvia Titotto

The role of biologically inspired design to 4D printing development — 205

Elaine Yoshiko Matsubara, Maria Isabel Felisberti, and José Mauricio Rosolen

Influence of different carbon nanotubes types in dynamic-mechanical properties of lightweight carbon felt/CNTs composites — 215

Leonardo G. Paterno, Ítalo Azevedo Costa, Maria José A. Sales, Michele A. Santos, Priscila R. Teixeira, and Priscilla P. Peregrino

Light-assisted synthesis of colloids and solid films of metallic nanoparticles — 225

Mayara Bortolotti Rossini, Narasimha Rao Mekala, Mauricio Chaves-Vargas, and Kai-Uwe Schröder

The influence of polymeric interlayers on damping behavior of a fiber metal laminate — 239

Abderrahmane Benchirouf and Olfa Kanoun

Piezoresistivity of low carbon nanotubes content in elastomeric polymer matrix — 259

Joachim Hausmann, Janna Krummenacker, Andreas Klingler, and Bernd Wetzel
**Improvement of fatigue strength of carbon fiber reinforced polymers by matrix
modifications for ultrafast rotating flywheels — 279**

Enio P. Bandarra Filho and Letícia Raquel de Oliveira
**Experimental study of thermal conductivity, viscosity and breakdown voltage of
mineral oil-based TiO_2 nanofluids — 291**