

Preface

This book discusses energy harvesting technologies for low-power wireless sensing platforms. This is a multidisciplinary topic requiring background from different physics-related disciplines such as thermodynamics and mechanics but also electrical engineering, optimization, and signal processing. In addition, material science and additive manufacturing has further helped develop low-cost sensors and circuits that enable form and cost reduction of such platforms and their ubiquitous application.

Our involvement in the field began around 2009. Apostolos and Ana had already been collaborating since 2004 in Spain in the context of a different research field, and around 2009 we decided to begin working on radio frequency (RF) energy harvesting. At this time, we were introduced to Manos during a meeting of the European Union (EU) European Cooperation in Science and Technology (COST) IC0803 project that we were running. From this moment, our collaboration in the field began, and over the last ten years we have produced numerous publications related to different aspects of energy harvesting.

Chapter 1 is an introductory chapter providing a brief overview and a perspective to the research and industrial possibilities related to such a multidisciplinary field of energy harvesting. Chapter 2 is devoted to 2D-3D integration of energy autonomous sensors using inkjet printing fabrication. Chapters 3–5 discuss solar, kinetic and thermal energy harvesting. Chapters 6 and 7 are devoted to wireless power transmission and RF energy harvesting. Chapter 8 discusses dc voltage conversion and power storage, and finally, Chapter 9 is devoted to a system overview of wireless sensing platforms with energy harvesting capability. As part of a course, one could begin with Chapter 1, follow with Chapter 2, and then cover the chapters related to the different energy harvesting technologies. Chapters 3 through 5 and the combined set of Chapters 6 and 7 could be taught in any order. Chapter 2 may also be offered after Chapters 3 through 7. One could then cover the final Chapters 8 and 9.

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We hope that the book can provide a starting point for our readers to the world of energy harvesting, and we welcome any comments and feedback!