

SPECIAL ISSUE

FUTURE NETWORKS WITH WIRELESS POWER TRANSFER AND ENERGY HARVESTING

Edited by B. Clerckx, Z. Popović, and R. Murch

8 Foundations of Wireless Information and Power Transfer: Theory, Prototypes, and Experiments

By B. Clerckx, J. Kim, K. W. Choi, and D. I. Kim

INVITED PAPER | This article provides a tutorial overview of the fundamental theoretical building blocks of wireless power transfer (WPT) and wireless information and power transfer (WIPT) followed by a discussion on the state-of-the-art experimental setups and prototypes.

31 Metamaterials and Metasurfaces for Wireless Power Transfer and Energy Harvesting

By J. Zhou, P. Zhang, J. Han, L. Li, and Y. Huang

INVITED PAPER | In this review article, it is shown that metamaterials and metasurfaces can significantly improve the power transfer efficiency and operational distance for wireless power transfer (WPT) systems.

56 Far-Field Wireless Power Harvesting: Nonlinear Modeling, Rectenna Design, and Emerging Applications

By X. Gu, S. Hemour, and K. Wu

INVITED PAPER | In this review article, recent developments and technology trends in far-field (radiative) wireless power harvesting are presented, including modeling of the rectification process, insights into integration of the rectifier and antenna (rectenna), and demonstrations of emerging applications.

74 Broadband RF Energy-Harvesting Arrays

By E. Kwiatkowski, J. A. Estrada, A. López-Yela, and Z. Popović

INVITED PAPER | This article compares design methodology and scalability of narrowband and broadband rectenna arrays for RF energy harvesting.

89 Adaptive Wireless Power Transfer and Backscatter Communication for Perpetual Operation of Wireless Brain-Computer Interfaces

By G. E. Moore, J. D. Rosenthal, J. R. Smith, and M. S. Reynolds

INVITED PAPER | This article describes efforts in eliminating tethers in brain-computer interfaces (BCIs) used in fundamental neurophysiology research.

107 Design and Analysis of SWIPT With Safety Constraints

By C. Psomas, M. You, K. Liang, G. Zheng, and I. Krikidis

INVITED PAPER | This article focuses on the design of wireless information and power transfer (WIPT) subject to health and safety constraints.

127 Resource Allocation for Simultaneous Wireless Information and Power Transfer Systems: A Tutorial Overview

By Z. Wei, X. Yu, D. W. K. Ng, and R. Schober

INVITED PAPER | This article focuses on the resource allocation problem in multiuser wireless information and power transfer (WIPT) with various models for the energy harvester and the channel state information.

[Continued on page 2 >]

DEPARTMENTS

3 SCANNING THE ISSUE

Future Networks With Wireless Power Transfer and Energy Harvesting

*B. Clerckx,
Z. Popović,
and R. Murch*

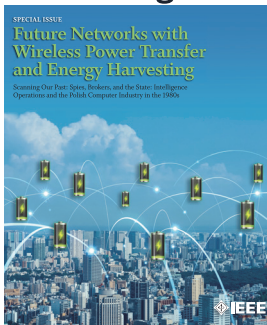
210 SCANNING OUR PAST

Spies, Brokers, and the State: Intelligence Operations and the Polish Computer Industry in the 1980s

M. Sikora

219 FUTURE SPECIAL ISSUE/SPECIAL SECTIONS

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On the Cover:

In a nod to this month's thematic coverage, our cover image embeds the concept of wireless power transfer and energy harvesting over the backdrop image of a city.

CONTENTS

CONTINUED FROM PAGE 1

SPECIAL ISSUE: Future Networks With Wireless Power Transfer and Energy Harvesting

150 Intelligent Reflecting Surface-Aided Wireless Energy and Information Transmission: An Overview

By Q. Wu, X. Guan, and R. Zhang

| INVITED PAPER | This article provides an overview of wireless power transfer (WPT) and wireless information and power transfer (WIPT) aided by intelligent reflecting surfaces (IRSs) from a communication and signal processing perspective.

171 Advances in Wirelessly Powered Backscatter Communications: From Antenna/RF Circuitry Design to Printed Flexible Electronics

By C. Song, Y. Ding, A. Eid, J. G. D. Hester, X. He, R. Bahr, A. Georgiadis, G. Goussetis, and M. M. Tentzeris

| INVITED PAPER | This article focuses on the use of backscatter communications in wireless power transfer (WPT) systems, highlighting newly emerged rectenna systems, waveform design and channel optimization, advanced device packaging and integration technologies, and also inkjet printing for sustainable systems.

193 Secure Wirelessly Powered Networks at the Physical Layer: Challenges, Countermeasures, and Road Ahead

By X. Lu, N. C. Luong, D. T. Hoang, D. Niyato, Y. Xiao, and P. Wang

| INVITED PAPER | This article discusses providing security using low-power physical layer techniques, reviewing fundamental principles of primary physical layer attacks, prevalent countermeasures, and open research issues.

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