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We Want It All

We have electromagnetics ideals. We want electrically small and wideband antennas, and we want them perfectly matched to their feeds. We want to be able to measure their radiation performances perfectly. We want the ability to cloak objects and make them "invisible" to incident electromagnetic waves across the spectrum. We want realistic simulation tools that are also fast and computationally efficient. We want all of the above to be implemented with ease and at a low cost.

Let me know when you want me to stop…

MATERIALS BEYOND THE NATURAL

These quests have been responsible for much innovation in our field. One of the areas in which we have seen quite a bit of interest and activity has been the investigation of the so-called metamaterials. If taken literally, metamaterials would mean "beyond materials," meaning beyond naturally occurring materials. The term invokes a range of reactions, as you might have witnessed in the literature of the past few decades. Regardless of whether your own reaction is favorable to the actual word or not, it is hard to deny that the underlying concept is quite appealing and that the analyses are based on sound and familiar physical principles. There have also been many successful implementations of metamaterials for a variety of applications.

Two feature articles in this issue of *IEEE Antennas and Propagation Magazine* (*APM*) address two different popular applications of metamaterials. The article by Yuste et al. starts with an informative overview and basic analysis of metamaterials-enabled "cloaks," meant to reduce scattering from simple objects. The analysis focuses on a frequency-selective surface approach, demonstrating scattering reduction using a simple mesh on a simple canonical object, a cylinder. There may still be some time before we can solve all of the practical problems related to size, cost, and bandwidth of such materials, but important steps are being taken along these lines.

The article by Gupta and Chaudhary tackles another popular application of metamaterials, namely, achieving good antenna bandwidth (multiband) with the radiating element substantially less than a tenth of a wavelength. This is shown to be possible using the zeroth-order resonance achieved through proper design of an equivalent lumped-element circuit model of the Composite Right/Left Handed transmission line structure.

ALSO IN THIS ISSUE

Each of the other four feature articles in this issue addresses key topics in simulating, building, or testing electromagnetic wave-based systems. The article by D'Aucelli et al. describes a versatile simulation tool for a variety of transmission line applications and, in particular, those relevant to distributed sensing systems. Rowe et al. discuss the limitations of the power-handling capabilities of non-Foster impedance-matching networks and propose guidelines for whether they are suitable for ultrawideband transmitting electrically small antennas.

Yang et al. propose a planar endfire circularly polarized antenna using the combination of a semicircular magnetic dipole and a V-shaped open loop, which may be suitable for future global navigation satellite systems and radio-frequency identification devices. Finally, the article by Rodriguez uses well-designed measurements to verify approximate analytical models provided by manufacturers for predicting the performance of anechoic chambers.

APM MAKING IMPACT

The 2017 Journal Citation Reports have been released, and they show that *APM* has made a substantial leap to reach its highest-ever impact factor of 3.007! I would like to thank you—as readers, authors, reviewers, editors, and editorial and production staff—for making this achievement possible. Please do let me know how we can make things even better!

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