

# **Mixed Signal and Analog Circuit Design with Memristors**

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## **Short Description of the Tutorial**

Memristors, emerging nonvolatile passive devices, have gained tremendous interest in recent years as memory technologies. These devices can store data as resistance and have several attractive properties that make them ideal candidates to replace existing memory technologies. Some of the characteristics of memristors, such as their analog nature, nonvolatility, small area, and compatibility with CMOS, make them attractive also for other applications.

This tutorial focuses on the use of memristors in mixed signal and analog circuits, and consists of three short parts. First, we will explain the basic properties of memristors and the state-of-the-art devices and applications. Then, we will show how memristors can be used as radiofrequency switches and their use in RF circuits. Finally, we will describe the use of memristors in intelligent data conversion circuits for reconfigurable digital-to-analog and analog-to-digital systems.

## **Biography**

Shahar Kvatinsky is an assistant professor at the Andrew and Erna Viterbi Faculty of Electrical Engineering, Technion – Israel Institute of Technology. He received the B.Sc. degree in computer engineering and applied physics and an MBA degree in 2009 and 2010, respectively, both from the Hebrew University of Jerusalem, and the Ph.D. degree in electrical engineering from the Technion – Israel Institute of Technology in 2014. From 2006 to 2009 he was with Intel as a circuit designer and was a post-doctoral research fellow at Stanford University from 2014 to 2015. Kvatinsky is an editor in *Microelectronics Journal* and has been the recipient of the 2015 IEEE Guillemin-Cauer Best Paper Award, 2015 Best Paper of Computer Architecture Letters, Viterbi Fellowship, Jacobs Fellowship, ERC starting grant, the 2017 Pazy Memorial Award, the 2014 and 2017 Hershel Rich Technion Innovation Awards, 2013 Sanford Kaplan Prize for Creative Management in High Tech, 2010 Benin prize, and six Technion excellence teaching awards. His current research is focused on circuits and architectures with emerging memory technologies and design of energy efficient architectures.