



Call for Papers  
for a Special Issue of  
IEEE Transactions on Electron Devices  
on  
“**Spintronics-Devices and Circuits**”

Spintronics is one of the emerging fields for the next-generation nanoscale devices offering better memory and processing capabilities with improved performance levels. It demonstrates great potential in the post-Moore era. Ever since the discovery of Giant Magneto-Resistance (GMR) effect in 1988, spintronics has shown a rapid progress. Recent advances has expanded this technology to the entire electronics industry of sensors, memories, oscillators, quantum information processors, computer architecture, brain inspired computing and various other fields. Spintronics is now one of the most researched areas and is on the verge of becoming a mainstream technology. A hard disk drive (HDD) invented by IBM in 1956, now has a global market revenue of approximately \$12bn. Other emerging field of application for this technology is magnetic field sensors that showcased a market revenue of ~ \$19b in 2018. The magnetic memory production at major foundries such as Samsung, Globalfoundries, Western Digital and TSMC marks the adoption of spintronics technology. However, in order to meet the ever-increasing demands of the industry, innovation in terms of modeling, design, materials, processes, circuits and applications are required. This Special Issue of the IEEE Transactions on Electron Devices will feature the most recent developments and the state-of-the-art in the field of spintronic devices, circuits and new architectures for high performance.

Topics of interest include, but are not limited to:

**Materials:** Ferromagnets, Antiferromagnets, 2D material for better spin manipulation and spin logic devices, Heusler alloys, dilute magnetic semiconductors (DMS), half-metallic ferromagnet (HMF)...

**Transport mechanism:** Spin accumulation, injection and detection in spin devices, spin pumping techniques, angular momentum transportation by spin polarized currents, spin waves, magnons, spin hall effect, spin transfer torque, enhancement in spin diffusion length and coherence time...

**Spintronics devices:** STT-MRAM, SOT-MRAM, VCMA-MRAM, domain-wall, skyrmions, nano-oscillators, sensors etc. Low power and high-speed switching schemes for spintronic devices.

**Optoelectronics and Spintronics:** All-optical switching of magnetization, inverse magneto-optical effects, single shot optical switching, modeling circuit and architecture level design for ultra-fast laser excitation...

**Memories:** High storage density MRAM, enhancement in power efficiency and speed.

**In-memory computing:** Spintronics based in-memory computing/ processing circuits/ architectures and applications...

**Quantum Computing:** Quantum information processing, protocol for communication, computation and sensing, algorithms, spin qubit, systems and applications, spintronics-based quantum memories...

**Neuromorphic computing:** Hardware implementation of neural networks, analog and digital, architectures and applications...

**Fabrication:** Fabrication and characterization of novel materials and devices, hybrid spintronics integration and fabrication...

**Spintronics based circuits:** Reconfigurable and programmable spintronics based circuits, Security applications including RNG and PUF, ADC/DAC, reliability and power performance analysis of spintronics based devices and circuits...

**Submission instructions:** Please visit the following link to download the templates:  
[http://www.ieee.org/publications\\_standards/publications/authors/author\\_templates.html](http://www.ieee.org/publications_standards/publications/authors/author_templates.html)  
In your cover letter, please indicate that your submission is for this special issue.  
Submission site: <https://mc.manuscriptcentral.com/ted>

The papers must present original material that has not been copyrighted, published or accepted for publications in any other archival publications, that is not currently being considered for publications elsewhere, and that will not be submitted elsewhere while under considerations by the Transactions on Electron Devices.

**Submission deadline: 30 September, 2021**

**Publication date: April 2022**

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