Call for Papers

Organic Electronics: A Circuits and Systems Perspective

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Scope and Purpose

The purpose of this special issue is to engage the engineering and scientific communities, particularly the IEEE, in the emerging ‘Organic Electronics’, also commonly known as ‘Printed Electronics’ (PE). The special issue is intended to delineate the state-of-the-art and challenges facing the PE industry, as well as, to present the current activities, solutions, and future work of researchers, both from academia and industry, in this emerging field. Another purpose is to connect the different disciplines embodied in PE, with emphasis on their implications to circuit design – from a circuits and systems perspective.

Broadly, PE encompasses five supply chains: (i) Materials; (ii) Processing Equipment/Platforms; (iii) Circuits/Power Source/Display/Memory/Sensors; (iv) System Integration; and (v) Test and Verification. The scope of this special issue virtually covers all these chains with focus on how they, individually or collectively, affect the printed elements and hence the ensuing circuits and systems. Of specific interest, the scope includes the co-design of the different chains with the third chain (Circuits/Power Source/Display/Memory/Sensors); particularly how innovative circuits and systems design may be able to circumvent or at least mitigate the formidable challenges and shortcomings of PE.

Both PE-only (fully-printed) and ‘Hybrid Electronics’ (embodifying a heterogeneous integration of conventional silicon transistors with printed circuit elements) on flexible substrate, such as PET plastic films, are within the scope of this special issue. However, there is emphasis for full realizations on flexible substrates (PE-only) as this significantly broadens the application space of PE, for instance, as a key technological enabler for the Internet-of-Things.

Put simply, the overall scope encompasses all aspects of the multi-disciplinary PE with emphasis in a circuits and systems perspective and includes:

a. Provide prevailing and open problems of PE to the engineering and scientific communities, including the circuits and systems and solid-state design communities;
b. Further to (a), from an academic and industry perspective; and from a theoretical and applied perspective;
c. Explore the co-design between all five chains of PE – with emphasis towards the co-design of analog, mixed-signal and digital PE circuits in view of the first two chains (respectively, Materials and Processing/Equipment Platform);
d. Challenge the circuits and systems and solid-state design communities to design intelligent PE-only circuits (i.e., no silicon or similar semiconductors);
e. Challenge the circuits and systems and solid-state design communities towards the co-design of PE with conventional silicon – the hybrid systems (analogous to 2.5D) – with a delineation of why one specific technology is advantageous (or disadvantageous), hence its adoption;
f. Present to researchers in the first two supply chains of PE (respectively, Materials, and Processing/Equipment Platform) the ‘wish-list’ of circuits and systems and solid-state communities (and vice versa); and
g. Offer some perspective to the future of PE-only and hybrid electronics.
Topics of interest
The emphasis of the topics are in the Circuits and Systems perspective, including the co-design of Circuits/Power Source/Display/Memory/Sensors (Chain (iii)) with the other chains [most pertinently, Materials (Chain (i)) and Processing Equipment/Platforms (Chain (ii)] to address the major challenges of PE realized as Printed Electronics-only and as Hybrid Electronics.

The topics from the circuits and systems perspective include:

a. Analog, Mixed-Signal and Digital circuits and systems realized in Printed Electronics-only that accommodates poor quality transistors, including low speed, high variances, low on-current/off-current ratios, etc.; and

b. Analog, Mixed-Signal and Digital circuits and systems realized in Hybrid Electronics, where the specific electronics type makes most sense.

The broader topics in all aspects of the multi-disciplinary Printed Electronics in support of the circuits and systems are of the interest as well. There include the five chains thereof: (i) Materials; (ii) Processing Equipment/Platforms; (iii) Circuits/Power Source/Display/Memory/Sensors; (iv) System Integration; and (v) Test and Verification.

The topics from an applications perspective include present and future envisioned applications of Printed Electronics, including as a key technological enabler for the Internet-of-Things objects.

Important dates
1 Manuscript submissions due (extended) 2016-04-25 2016-05-08
2 First round of reviews completed 2016-06-30
3 Revised manuscripts due 2016-08-05
4 Second round of reviews completed 2016-09-05
5 Final manuscripts due 2016-10-01

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