Editorial
Introduction to the Third Issue

ON BEHALF of the steering committee and the editorial board of the IEEE JOURNAL ON FLEXIBLE ELECTRONICS (J-FLEX), it is with great pride that I am writing to announce the publication of this third issue. The first two issues of the journal have already generated considerable interest and I hope this third issue will continue the trend and help the flexible and printed electronics community with impactful high-quality articles. Within a short span, J-FLEX has become one of the high-performer IEEE JOURNALS. This would not have been possible without the outstanding contributions from the Editorial Board members.

J-FLEX is a joint publication of IEEE Sensors Council, IEEE Electron Device Society, and IEEE Circuits and Systems Society. The journal continues to have strong linkages with the annual conferences by the sponsoring council and societies. For example, a special journal issue based on expanded papers, presented during IEEE International Conference on Flexible Printable Sensors and Systems (FLEPS) in Vienna in July 2022, is currently in progress. Likewise, a special section has been announced to include in a future regular issue few expanded papers presented during the International Flexible Electronics Technology Conference (IFETC). In the larger interest of the Flexible and Printed Electronics Community, J-FLEX will continue this trend in the future.

The journal aims to publish cutting-edge research covering all aspects of sensors, transistors, related devices, circuits, and systems on flexible, disposable, stretchable, and degradable substrates. This includes various functional and sustainable materials, material-integrated sensing, interface subsystems, corresponding actuators, energy harvesting, energy storage devices, modeling, simulation, manufacturing, integration or packaging in soft and flexible substrates and all applications of flexible electronics. Topics such as 3-D printed or heterogeneous integration, use of sustainable materials and processes aligned with circular economy are also in the scope of this journal. Some of these topics has been covered in the three newly announced special journal issues. These include 1) flexible electronics for emerging markets and developing economies; 2) self-powered sensors and wearable electronic systems; and 3) neuromorphic devices and circuits for next-generation flexible electronics. The details of these special journal issues are given in the call for papers included in this third issue. J-FLEX is constantly seeking and willing to work with the proposers of Special Journal Issues on hot topics within scope described above. The journal wishes to serve as an international forum for the topics within its scope and disseminate the results guaranteeing scientific excellence.

This third issue features six research articles. In the first research article [A1], Pimpolari et al. report fully inkjet-printed Schottky diodes on Kapton and paper substrates using carbon nanotubes and graphene. The authors demonstrate both ohmic and Schottky contacts between printed nanotubes and graphene with post-printing thermal treatments at different temperatures. The diodes presented in this work can operate at low voltages, exhibit excellent mechanical stability, and have a maximum operating frequency in the order of 5 MHz.

In the second research article [A2], Corsino et al. use the conventional UV lithography and self-alignment methods to develop InGaZnO-based high-speed thin film transistors (TFTs). The TFTs exhibit threshold voltages around 0 V and excellent ON/OFF ratios of $\approx 10^{10}$. The article shows that the conventional TFTs are easier to fabricate, and have comparably higher mobilities up to 16 $cm^2V^{-1}s^{-1}$. However, the self-aligned TFTs show better ac performance, demonstrating a maximum oscillation frequency of 216 MHz.

In the third article [A3], Monne and Chen present a printed flexible micro-electro-mechanical-system (MEMS) switch for dc switching applications. The switch can actuate at a low voltage of (0.1–1.0) V, and a current ON–OFF ratio of 6.5×10^7 with the highest current > 40 mA. The turn-ON and turn-OFF times of presented device are 25 μs and 10 μs, respectively—thus, the entire switching time is 35 μs. With low cost and high current ON–OFF ratio characteristics, this printed MEMS switch can possibly be a good alternative for the TFT-based traditional switches.

In the fourth article [A4], Sharma and Sarris present optically transparent electromagnetic screens for shielding applications that require visual observation. The aluminum-doped zinc oxide thin films deposited on plastic are presented as absorbing-type shields. Likewise, the reflecting-type shields based on all-metallic single layer are presented. This combination of shielding and optical transparency is attractive for applications such as curtains or windows for indoor environments and vehicles.

In the fifth article [A5], Gardner and Haider present a current-controlled graphene inkjet-printed artificial neuron for a recurrent neural network. The authors show that the testing performance of the simulated neuron was marginally better than the sigmoid and hyperbolic tangent functions.

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Finally, in the sixth article [A6], Kumar et al. present a flexible and light-sensitive piezoelectric nanogenerator (PENG) based on electrospun nanofibers of polyvinylidene fluoridetrifluoroethylene and N,N′-bis(1-ethylpropyl)-perylene-3,4,9,10-tetracarboxylic diimide (PVDF-TrFE:PDI). The authors show that the incorporation of PDI molecules significantly improves the crystallinity and β-phase content of PVDF-TrFE:PDI nanofibers. As a result, a higher piezoelectric response is observed. Furthermore, the presented hybrid nanofibers can absorb/emit light in the visible regime and could be suitable for application in self-powered wearable systems.

This third issue owes much to many people. Thanks are due to the IEEE publications team for helping us during this initial setting up phase of the Journal. Thanks are due to members of the editorial team who have worked hard to make this issue happen. Their professionalism, timely action, and attention to detail have made seeing this third issue a real pleasure. Thanks also to all the reviewers who have so generously given their time and expertise to ensure high quality. I also thank the John Wright, J-Flex Admin Support Staff, for his continuous support ensuring the timely completion of various administrative tasks.

I hope that you will enjoy reading this third issue and that you find these articles useful to stimulate your research into the vibrant area of flexible and printed electronics. I invite you to submit your best articles for publication.

With my kindest regards.

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APPENDIX: RELATED ARTICLES

[1] L. Pimpolari et al., "Fully printed and flexible Schottky diodes based on carbon nanomaterials operating up to 5 MHz," *IEEE J. Flexible Electron.*, vol. 1, no. 3, pp. 153–158, Jul. 2022, doi: 10.1109/JFLEX.2022.3215928.

[2] D. Corsino et al., "Monolithic integration, performance and comparison of self-aligned and conventional IGZO thin-film transistors on a flexible substrate," *IEEE J. Flexible Electron.*, vol. 1, no. 3, pp. 159–166, Jul. 2022, doi: 10.1109/JFLEX.2022.3210492.

[3] M. A. Monne and Y. M. Chen, "High current on-off ratio inkjet-printed flexible micro-electro-mechanical-system (MEMS) switch," *IEEE J. Flexible Electron.*, vol. 1, no. 3, pp. 167–173, Jul. 2022, doi: 10.1109/JFLEX.2022.3205559.

[4] S. K. Sharma and C. D. Sarris, "EMI shielding using flexible optically transparent screens for smart electromagnetic environments," *IEEE J. Flexible Electron.*, vol. 1, no. 3, pp. 174–184, Jul. 2022, doi: 10.1109/JFLEX.2022.3202146.

[5] S. D. Gardner and M. R. Haider, "An inkjet-printed artificial neuron for physical reservoir computing," *IEEE J. Flexible Electron.*, vol. 1, no. 3, pp. 185–193, Jul. 2022, doi: 10.1109/JFLEX.2022.3193346.

[6] P. Kumar, S. Choudhary, K. P. Sharma, S. K. Sharma, and R. Singh, "Light-sensitive PVDF-TrFE: PDI hybrid nanofibers based flexible bimodal piezoelectric nanogenerator," *IEEE J. Flexible Electron.*, vol. 1, no. 3, pp. 194–202, Jul. 2022, doi: 10.1109/JFLEX.2022.3189946.