

2022 IEEE International Flexible Electronics Technology Conference (IFETC 2022)

**Qingdao, China
21 – 24 August 2022**



**IEEE Catalog Number: CFP22M87-POD
ISBN: 978-1-6654-6969-2**

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP22M87-POD
ISBN (Print-On-Demand):	978-1-6654-6969-2
ISBN (Online):	978-1-6654-6968-5

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Message from the Committee	vi
Organizing Committee	vii
Plenary 1: Flexible inorganic substrates for electronic device integration <i>Cheng-Gang Zhuang</i>	viii
Plenary 2: Future oxide, Challenges and Applications <i>Guangcai Yuan</i>	ix
Plenary 3: Flexible Electronic Skin for Robotics and Interactive Systems <i>Ravinder Dahiya</i>	x
Plenary 4: The Energy Revolution Driven by Thin Film Processing <i>Neil Morrison</i>	xi
Plenary 5: Flexible integrated circuits: design, manufacture and applications <i>Xue Feng</i>	xii
Plenary 6: Flexible OLED Displays with Ink-Jet Printing Technology <i>Weiran Cao</i>	xiii
Plenary 7: TFT Foundry MPG for Display and Sensor Development – Design, Prototype material, Equipment <i>Feng Qin</i>	xiv
Flexible, Scalable and Buckled Electronics Based on Oxide Thin-Film Transistors <i>Giuseppe Cantarella; Federica Catania; Niko Münzenrieder; Luisa Petti</i>	1
Organic and Carbon Nanotube Electronics for Flexible Nanoscale High-Frequency Circuits and Physical Unclonable Function <i>James W Borchert; Patrick Schuster; Jonas Schroeder; Peter Eder; Stefan Heiserer; Josef Biba; Georg Duesberg; Ulrich Rührmair; Thomas Weitz</i>	3
Femtosecond Laser Induced Supermetallophobicity for Design and Fabrication of Flexible Tactile Electronic Skin Sensor <i>Chengjun Zhang; Haoyu Li; Qing Yang; Xun Hou; Feng Chen</i>	5
Automatic Droplet Splitting and Routing Algorithm on Digital Microfluidics Chip <i>ChunYu Chang; Ge Li; Yan Zheng; Chenxuan Hu; Hanbin Ma</i>	7
Doping of Sn-Based Two-Dimensional Perovskite Semiconductor for High-Performance Field-Effect Transistors <i>Yu Liu; Yuanyuan Hu</i>	9
Ionic Defect Analysis in Flexible Hybrid Perovskite Memristor Using Deep Level Transient Spectroscopy <i>Himangshu Jyoti Gogoi; Abdul Andrabi; Raja Muddam; Arun Mallajosyula</i>	11
Design Thinking for Human Interaction With Flexible Electronics <i>Mitsuhiko Nagata</i>	13
Self-Powered Electro-Tactile System for Virtual Tactile Experiences <i>Yuxiang Shi; Xiangyu Chen; Zhong Lin Wang</i>	15
Bio-Inspired Perspiration-Wicking Electronic Skins for Comfort and Reliable Multimodal Health Monitoring <i>Zhuo Li; Yanting Xu; Shiqing Zhou; Guoqing Yang</i>	17
Printing Techniques for Integration of Inorganic Nanomaterials on Flexible and Biodegradable Substrates <i>Abhishek S. Dahiya; Ravinder Dahiya</i>	19
Stretchable and Highly Conductive AgNPs/SBS Film With Wrinkled Ag Layer for Electromagnetic Interference Shielding <i>Zeyu Zhao; Dingkun Tian; Zhiqiang Lin; Yadong Xu; Yougen Hu; Rong Sun</i>	21

Flexible, Planar, and Stable Electrolyte-Gated Carbon Nanotube Field-Effect Transistor-Based Sensor for Ammonium Detection in Sweat	23
<i>Mattia Petrelli; Bajramshahe Shkodra; Martina Aurora Costa Angeli; Alessandra Scarton; Silvia Pogliaghi; Roberto Biasi; Paolo Lugli; Luisa Petti</i>	
Responsive Organometallic Semiconductors for Optoelectronic Applications	25
<i>Qiang Zhao</i>	
Vertically Stacked Printable Organic Photodetectors for High-Performance Color Sensing	27
<i>Vincenzo Pecunia</i>	
Plasmonic biosensing of kidney wastes using carbon-based derivatives	29
<i>P S Menon; K Loganathan; N A Jamil; N R Mohamad; C F Dee; M F M R Wee; M A Mohamed; H Soleimani; B Y Majlis; A A Hamzah</i>	
Flexible Micro-ECOG Electrodes Based on Bacterial Cellulose Substrate With Ultrasoftness and Long-Lasting Moisture	31
<i>Yuhao Zhou; Kai Zhang; Minghao Wang; Mengfei Xu; Xiaoli You; Honglong Chang; Jingquan Liu; Bowen Ji</i>	
Artificial Synapse Based on Dual-Gate Organic Thin-Film Transistor	33
<i>Weihong Yang; Xiaokuan Yin; Lei Han; Simon Ogier; Xiaojun Guo</i>	
Yarn Based UV Photodetectors for E-Textiles	35
<i>Gaurav Khandelwal; Abhishek S. Dahiya; Ravinder Dahiya</i>	
Patterning ITO Using a Laser Cut Kapton® Tape Mask for Flexible PVDF Applications	37
<i>Kyle M Schvaneveldt; Emily Laughlin; Elias Guanuna; Keaton Shurilla; Luke Johnson; Jessica Staker; Quinn Hunsaker; Daniel Smalley</i>	
Strategy Toward High-Mobility Oxide Semiconductor Thin-Film Transistors by Atomic Layer Deposition	39
<i>Mengwei Si; Ziheng Wang; Xiuyan Li</i>	
A Flexible fNIRS System Employing Super-Resolution Technique for Nature-Scenario High-Resolution Brain Functional Imaging	41
<i>Yuxiang Lin; Zhouchen Ma; Cheng Chen; Nabil Sabor</i>	
An Event-Driven System Architecture for Smart Flexible Sensors in Healthcare Applications	43
<i>Yang Zhao; Yongfu Li; Mingyi Chen; Jun Zhou; Guanghui He; Yu Liu; Jian Zhao; Bo Zhao; Min Lin; Xiaosong Wang; Sujie Chen; Zhengfang Qian; Yong Lian; Tianwei Wan</i>	
Energy-Efficient Body-Channel Communication for Distributed Flexible Sensors	45
<i>Xu Liang; Tao He; Gang Wang; Yabin Zheng; Jian Zhao; Yong Lian</i>	
Dry-Electrode Interface Circuit for Flexible ECG Sensors	47
<i>Yanxing Suo; Xinzi Xu; Peiyi Zhou; Xiao Han; Qiao Cai; Min Wang; Yang Zhao; Guoxing Wang; Tianwei Wan</i>	
Flexible Bluetooth Antennas Integrated With Electrodes for Wearable ECG Sensors	49
<i>Ruihua Deng; Jijun Peng; Zhengfang Qian; Dongting Jiang; Xiangxu Dai; Hao Liang; Yiling Sun; Sujie Chen</i>	
The Mechanical Reliability Design of Thin-Film Encapsulation for Laminated-Based Flexible Organic Light Emitting Diodes Using Semi-Analytical Method	51
<i>Sixin Huang; Haohui Long; Jianhui Li; Jianping Fang; Jiaying Gao</i>	
A Novel Pixel Circuit Compensating for Threshold Voltage Variation and OLED Degradation	57
<i>Yingtao Xie; Penglong Chen; Kunlin Cai; Huan Jian</i>	
A Flexible Tactile Sensor Interfaced With a TFT Analog Front-End for Material Texture Recognition	59
<i>Jianle Lin; Huimin Li; Anqi Li; Bowei Jiang; Xinghui Liu; Kai Wang</i>	
Computational Design of Flexible Organic Porous Nanotubes	61
<i>Guangzheng Yi; Ai Fu; Yuan Li</i>	

A Computing-In-Memory Cell Design Based on LTPO Hybrid Thin Film Transistor Integration	63
<i>Liankai Zheng; Yu Huang; Xiaojun Guo</i>	
Active-Matrix Digital Microfluidics Chip for Efficient Droplets Manipulation	65
<i>Dongping Wang; Qi Huang; Longqian Xu; Siyi Hu; Hanbin Ma</i>	
Portable Electrochemical Biosensors for Highly Sensitive Detection of Biomarkers	67
<i>Ying Fu; Feng Yan</i>	
Selective Doping of a Single Ambipolar Organic Semiconductor for Device Fabrication	69
<i>Yanqin Chen; Yu Liu; Yuanyuan Hu</i>	
Flexible Sensors, Circuits, and Systems for Bioelectronic Interfacing	71
<i>Le Xing; Zixin Wang; Aula Alwattar; Alexander J Casson</i>	
Piezotronic Organic (P)-Inorganic(N) Diode-Based Heterojunction in Wearable Harvesters/Sensors	73
<i>Zihao Liang; Weiwei Li; Ahmed Rasheed; Kai Wang; Hang Zhou; Emad Iranmanesh</i>	
Experimental and Simulation Studies of Strong Coupling Between Frenkel Excitons and Surface Plasmon	77
<i>Clarence Augustine TH Tee; Muhammad Asif Ahmad Khushaini; Nur Hidayah Azeman; Tg Hasnan Tg Abdul Aziz; Ahmad Ashrif A Bakar; Burhanuddin Yeop Majlis; Ahmad Rifqi Md Zain; Yeo Wey Ping; Xu Zongwei</i>	
Ultra-Sensitive Pyrene Based of Room Temperature (RT) Organic Small Molecule Ammonia Detecting Sensor	79
<i>Muhammad Naeem Shah; Clarence Augustine TH Tee; Burhanuddin Yeop Majlis; Faheem Ullah Khan; Shahzad Afzal; Tariq Aziz; Yeo Wey Ping; Tg Hasnan Tg Abdul Aziz; Ahmad Rifqi Md Zain</i>	
Analysis of Bioparticles Chaining Under Electrode-Isolated Dielectrophoresis Towards Flexible BioMEMS Application	81
<i>Clarence Augustine TH Tee; Burhanuddin Yeop Majlis; Mohd Anuar Md Ali; Aminuddin Bin Ahmad Kayani; Yeo Wey Ping; Song Le; Zheng Yelong</i>	
Exploration of Promising Polymers and Polyelectrolyte in Inorganic-Organic Bi-Layer Gate Dielectrics for Flexible OFETs	83
<i>Sachin Rahi; Vivek Raghuvanshi; Pulkit Saxena; Gargi Konwar; Shree Prakash Tiwari</i>	
Mitigating the Impact of Thermoplastic Polyurethane Films on the Performance of Electronic Textiles	85
<i>Tiancheng Xu; Irene Goldthorpe</i>	
Implementation of Binary Neural Network With Low Temperature Polycrystalline Silicon TFT SRAM Array	87
<i>Mengqian Zou; Xiaojun Guo; Jun Li</i>	
N-I-P Perovskite Solar Cells on Opaque Flexible Stainless-Steel Substrate	89
<i>Sandeep Kumar; Nisheka Anadkat; Sushobhan Avasthi</i>	
A Switched-Capacitor Based Amplifier Using Organic Thin-Film Transistor	91
<i>Li'ang Deng; Lei Han; Xiaojun Guo</i>	
A Deformable Fingertip Sensor Assists the Manipulator in Distinguishing the Hardness of the Object	93
<i>Nengmin Liang; Chao Shang; Qunhui Xu; Yinghong Li; Zhengchun Peng</i>	
Organic Ferroelectric Non-Volatile Memory Transistors	95
<i>Jiangnan Xia; Yuanyuan Hu</i>	
Trap Passivation by Reactive Oxygen for Reducing Hysteresis in Organic Field-Effect Transistors	97
<i>Ping-An Chen; Yuanyuan Hu</i>	
Flexible RRAM With Natural Gelatin Exhibiting High Current On/Off Ratio and Retention	99
<i>Anurag Dwivedi; Anil Lodhi; Shalu Saini; Harshit Agarwal; Shree Prakash Tiwari</i>	

A Novel Bioelectrode Design With an OTFT Switch for Dynamic Discharging	101
<i>Taoming Guo; Chen Jiang</i>	
A Stretchable Conductor Based on Shrinkable Fiber Mat for Wearable Joule Heating	103
<i>Qingsong Li; Jing Sun; Guanglin Li; Zhiyuan Liu</i>	
Flexible and Anti-Freezing Quasi-Solid-State Magnesium-Ion Hybrid Supercapacitor Working at -40 °C	105
<i>Gangrui Qu; Guoshen Yang; Chi Fang; Hang Zhou</i>	
Liquid Metal for Soft-Hard Interface in Stretchable Electronics	107
<i>Rui Su; Qingsong Li; Qiong Tian; Zhiyuan Liu</i>	
3D Bio-Printed Light-Sensitive Cell Scaffolds Based on Polymer Nanoparticles for Bio-Photonics Applications	109
<i>Manuela Ciocca; Camilla Febo; Fahimeh Masoumi; Antonio Altana; Giuseppe Cantarella; Paolo Lugli; Luisa Petti</i>	
Embedded Low Power Heart Rate Estimation Processor for Flexible Applications	111
<i>Hui Qiu; Huajing Qin; Jiahao Liu; Liang Zhou; Liang Chang; Jun Zhou</i>	
Ordered Mesoporous Carbon as Ion-To-Electron Transducers for Flexible Ion Sensitive Organic Field Effect Transistor	113
<i>Yawen Song; Wei Tang; Lei Han; Xin Xi; Yukun Huang; Ruili Liu; Yuezeng Su; Xiaojun Guo</i>	
Chemically-Mediated Artificial Neuron	115
<i>Yuanyuan Tian; Kaiyu Cai; Xiao Zhao; Ting Wang</i>	
Highly sensitive, flexible, force sensors based on short channel devices	117
<i>Antonello Mascia; Andrea Spanu; Annalisa Bonfiglio; Piero Cosseddu</i>	
A Cut-Off Frequency Measurement Platform for Subthreshold TFTs	119
<i>Yangkun Hou; Dongping Wang; Hanbin Ma; Chen Jiang</i>	
A 10×10 TFT-Based Flexible Tactile Sensor Array for Haptics	121
<i>Xinghui Liu; Jianle Lin; Anqi Li; Huimin Li; Kai Wang</i>	
High-Voltage LTPS TFT Shift Register for Active Matrix Digital Microfluidics	123
<i>Shengzhe Jiang; Yingbo Wei; Jun Yu; Dongping Wang; Hanbin Ma</i>	
High-Integrated Quantum Random Number Generator Chip Based on Vacuum Fluctuation	125
<i>Yaqi Feng; Jifang Tao; Yan Li</i>	
Multiple Design Strategies of Flexible Piezoresistive Pressure Sensors in Radial Artery Pulse Signals Monitoring	127
<i>Zhiran Shen; Tian Hang; Xi Xie; Hui-Juan Chen; Fanmao Liu</i>	
A Distributed Flexible Optical Fiber F-P Battery Temperature Detection System Based on Thermo-Optic Effect	129
<i>Xiaoke Li; Jifang Tao; Yan Li</i>	
Design and Evaluation of a Highly Robust MEMS Pirani Vacuum Gauge Based on Porous Silicon Thermal Insulation Layer	131
<i>Zichao Zhang; Jifang Tao; Yan Li</i>	
Hetero-Doped Silicon Modulator With Bandwidth Expansion	133
<i>Huajiang Yuan; Jia Zhao; Chonglei Sun</i>	
Mechanism Study of Positive-Bias Stress Stability for Solution Processed Oxide Semiconductor TFT	135
<i>Haixin Li; Guangwei Xu; Shibing Long</i>	
An Active Neural Optrode With Metal Shielding Laser Diode and Electrochemical Modified Microelectrodes for Low Noise Optogenetics	137
<i>Minghao Wang; Minyi Jin; Ye Fan; Jiahui Xu; Bowen Ji; Ying Chen; Yuhua Cheng; Gaofeng Wang</i>	

A Microneedle Array-Based Dry ECG Electrode With High Recording Performance for Healthcare Applications	140
<i>Ye Fan; Minghao Wang; Jiahui Xu; Minyi Jin; Bowen Ji; Ying Chen; Yuhua Cheng; Gaofeng Wang</i>	
Flexible Mechanical Sensors-From Orange Peel to Highly Ductile Conductive Hydrogels	144
<i>Zhuo Qing Ran; Ning Ma; Fang Chang Tsai</i>	
Mixed-Dimensional 2D/3D Photodetectors With High Performance and New Functions	146
<i>Chi Liu; Dongming Sun</i>	
A Thin Film and High Roughness Flexible Current Collector for High Charging/discharging Rate Flexible Li-ion Battery	148
<i>Guangqi Ouyang; Haoxiang Ren; Henry Sun; Subramanian S. Iyer</i>	
Author Index	151