

2024 International Conference on the Challenges, Opportunities, Innovations and Applications in Electronic Textiles (E-Textiles 2024)

**Berlin, Germany
19-21 November 2024**



**IEEE Catalog Number: CFP249A7-POD
ISBN: 979-8-3315-1687-1**

**Copyright © 2024, Fraunhofer IZM
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:	CFP249A7-POD
ISBN (Print-On-Demand):	979-8-3315-1687-1
ISBN (Online):	978-3-00-080429-8

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

Session 1: Design & Fashion

No.		Page
1	Gillian Lake-Thompson et al. "Design and Development of a Knitted E-textile Sensing Garment for Fetal Heart Monitoring", <i>University of Southampton, Princess Anne Hospital Southampton (UK)</i>	1
2	Satu Jumisko-Pyykkö et al. "Spiritus Ludi: Smart Wearable Textiles that Foster and Elevate Connections in E-sports Teams", <i>Häme university of applies sciences, Tampere University (FI)</i>	8
3	Sophie Skach & Berit Greinke "Towards a Taxonomy of Novel Knitted Fold Sensors", <i>Queen Mary University of London (UK), Universitaet der Kuenste Berlin (DE)</i>	20

Session 2: Applications

No.		Page
4	Malindu Ehelagasthenna et al. "Vibrotac-Glove: Designing a Novel Haptic Glove as an Assistive Device", <i>Nottingham School of Art & Design, Nottingham Trent University (UK)</i>	29
5	Suparna Veeturi et al. "Evaluating Dry Electrodes and Bioinstrumentation for Wearable Arm ECG Acquisition", <i>University of Rhode Island, University of Massachusetts Chan Medical School (US)</i>	39
6	Basel Adams et al. "AI-Enhanced Smart Textile System for the Monitoring of Cardiovascular Insufficiency", <i>Fraunhofer IZM, Charité (DE)</i>	46
7	Parvin Ebrahimi et al. "Further Optimization of Solar Electronic Yarns for Developing Large, Stretchable Knitted Textile Solar Panels", <i>Nottingham School of Art & Design, Nottingham Trent University (UK)</i>	58
8	Yuanlong Li et al. "Electrospinning-Based All-fiber TENGs for Wearable Energy Harvester", <i>ETH Zurich (CH), Donghua University Shanghai (CN)</i>	67

Session 3: Manufacturing

No.		Page
9	Michael John Lynch et al. "Breaking Barriers in E-Textile Production: Industry- Driven Solutions for Scaling", <i>University of Southampton (UK)</i>	71
10	Tuomas Happonen and Mikko Paakkolanvaara "Stretching Reliability of SMD Electronics Integrated on Elastic Fabric", <i>VTT, Screentec Oy (FI)</i>	78
11	Mahmoud Wagih et al. "Heterogenous and Flexible E-Textile Power Electronics: Enabling Novel Battery-Free Wearable Applications and Outperforming Rigid Components", <i>University of Glasgow, University of Southampton (UK)</i>	87
12	Lars Stagun et al. "Towards industrialized E-Textile assembly: Low Temperature Optimization of Textile-Electronic NCA Bonding", <i>Fraunhofer IZM, TU Berlin (DE)</i>	91

Session 4: Sustainability & Circularity

No.		Page
13	Wei Wang & Daria Casiciani "Bridging the Gap: Exploring Interdisciplinary Design and Development Processes in E-Clothing", <i>Politecnico di Milano (IT)</i>	98
14	Amy Kerr et al. "Socially-Inclusive Disassembly Solutions for E-textiles", <i>Saxion University (NL)</i>	109
15	Sofía Guridi et al. "Sense and Degrade: Fully Bio-Based and Biodegradable E-Textile Capacitive Sensor", <i>Aalto University (FI)</i>	118

Session 5: Reliability & Testing

No.		Page
16	Kaspar Jansen et al. "Validation Tests on a Knitted Respiration Sensor", <i>TU Delft, Biocheck BV (NL)</i>	126
17	Sarah Kim et al. "Flat-knitted Piezoresistive Pressure Sensors: An Investigation of the Influence of the Knitting Structure on the Electromechanical Properties", <i>German Institutes of Textile and Fiber Research, University of Stuttgart (DE), Sefar AG (CH)</i>	131
18	Chakaveh Ahmadizadeh et al. "Washability Testing of Wearable E-textiles for Robustness in Daily Use", <i>ETH Zurich (CH)</i>	138

19	Md Abdullah al Rumon et al. "TexSense: Comparative ECG Analysis of E-Textile and Sticky Electrodes During Motion Artifacts", <i>University of Rhode Island (US)</i>	146
20	Gillian Lake-Thompson et al. "Design and Development of an E-textile Sock for the Monitoring of Distress in People with Dementia", <i>University of Southampton, Milbotix Ltd. (UK)</i>	156

Session 6: Research & Technology

No.		Page
21	Jidong Liu et al. "Solution Processed Flexible Electroluminescent Yarns for Advanced Textile Integration", <i>University of Southampton (UK)</i>	164
22	Ruairi Coulter et al. "Design and Development of a Nylon Based Actuator for use in a Soft Robotic Glove", <i>Dublin City University (IE)</i>	168
23	Weifeng Yang et al. "Mechanoluminescent Fibers for Visualizing Motion Sensing", <i>ETH Zurich (CH), Donghua University (CN)</i>	173
24	Erin P Tillery et al. "A Miniaturized DC Haptic Stimulation Design for E-Textiles", <i>North Carolina State University (US)</i>	177
25	Valeria Galli et al. "All-textile Pressure Sensitive Sock for Mobile Health Applications", <i>ETH Zurich (CH)</i>	182

Poster Session 1

No.		Page
26	Vladan Koncar et al. „Textile Thread Piezoresistive Transducer for Airflow Characterization", <i>ENSAIT (FR)</i>	189
27	Alexandar Todorov et al. "Investigating Structural and Positional Impact on ECG Signal Quality of Knitted Active Electrodes for Real Time Healthcare Monitoring", <i>University of Southampton (UK)</i>	193
28	Thelge Peiris et al. "Development and Optimisation of Textile-Based Optical Sensors for Cardiac Health Monitoring", <i>Nottingham Trent University (UK)</i>	198
29	Daniela Moracova et al. "Highly Conductive Hybrid Threads for E-textile Applications", <i>University of West Bohemia (CZ)</i>	205
30	Julius Scherf et al. "Wearable Health Monitoring Textile Band with Direct Inkjet-printed Electronic Island", <i>Profactor GmbH (AT)</i>	211

31	Wilson Hou-Sheng Huang et al. "A Uniform Electro-Thermal Film for Electronic Clothing", <i>Chung Hua University (TW)</i>	216
32	Kalana Marasinghe et al. "The Design and Development of a Temperature Sensing Vest for the Monitoring of On-body Skin Temperature", <i>Nottingham Trent University (UK)</i>	221
33	Cristina Oliveira et al. "Implementation of an Automated Pilot Line for Smart Gown Production", <i>CITEVE, CENTI, Têxteis J.F. Almeida S.A. (PT)</i>	229
34	Gabriel Digregorio and Jean-Michel Redouté "Thin Gold Film deposited on PDMS for Stretchable Electrical Interconnections and Bio-compatible Applications via Textured 3D Printed Mold", <i>ULiege (BE)</i>	234
35	Babak Abdi et al. "Developing High-Performance, Eco-Friendly ETextiles Using Carbon-based and Bio-Coating Techniques", <i>Aalto University (FI)</i>	239
36	Vignesh Ravindrachan et al. "KinGloves: Rapid Prototyping of Usability Enhanced Sensing Gloves for Parkinson's Disease", <i>University of Rhode Island, Nautilus Defense, Rock Steady Boxing (US), Indian Institute of Information Technology (IN)</i>	244
37	Ibrahim Halwani et al. "Textile-based Actuators for Generating Variable Haptic Effects for the Transmission of Signals and Environmental Impressions via Clothing", <i>TITV Greiz, TITK Rudolstadt (DE)</i>	253
38	Mina Laghaei Khoulenjani et al. "Fabrication of Textile Dry Electrodes Compatible with a Strong Magnetic Field and Skin-to-Electrode Impedance Measurement", <i>University of Lille (FR)</i>	259
39	Abiodun Komolafe et al. "E-textiles in STEM Outreach and Education", <i>University of Southampton (UK)</i>	265

Poster Session 2

No.		Page
40	Emma Wood "Designing a Flexible, Low-Waste System for Hand-Sampling with Conductive Warp Yarns", <i>Universität der Künste Berlin (DE)</i>	269
41	Rhys Morton et al. "Heatleaf: Developing a Wearable Device to Improve Amputees' Lives", <i>CPI, Heatleaf (UK)</i>	273
42	Barbro Scholz „Textile Pleats and Light on the Body", <i>University of Applied Sciences Hamburg (DE), Leiden University (NL)</i>	279

43	Cristina Olivera et al. "Innovative Textile Thermal Management Solutions for Automotive Interior Applications", <i>CITEVE, CENTI, ISQCTAG, Simoldes Plásticos, S.A. (PT)</i>	284
44	Tom Greig et al. "Gold Tooled E-Textiles Circuits on Bookcloth", <i>University of Southampton (UK)</i>	288
45	Bornali Sarma et al. "Design of textile-based flexible, eco-friendly pressure sensors embedded with Ag/Cu nanoparticles using plasma sputtering technology", <i>University of Delhi (IN)</i>	294
46	Bouzan Hammoudeh et al. "Evaluation of Textile Electrodes for Bioelectric Signal Acquisition Using a Simulated Muscle Skin Model", <i>TITV Greiz (DE)</i>	301
47	Kirsten Weide-Zaage et al. "Simulation of Corrosion Effects in Conductive Yarns", <i>Leibniz University Hannover (DE)</i>	307
48	Martin Janda et al. "Behavior of Printed Conductive Structures Under Cyclic Load Realized by Direct-Write on a Textile Substrate", <i>University of West Bohemia (CZ)</i>	312
49	Lei Jing et al. "An Efficient Method for Calibrating Piezoresistive Pressure Sensors", <i>University of Aizu (JP)</i>	318
50	Yong Sheng et al. "Nonenzymatic Yarn Sensor for Glucose Monitoring", <i>University of Southampton (UK)</i>	324
51	Claire Eliot et al. "Textile Sensory Array for Accurate, Long-Lasting, and Reliable Position and Wide-Range Pressure Detection", <i>ENSAIT (FR)</i>	328
52	Jiri Navratil et al. "En-Garde Innovation: Advancing Epee Fencing with the E-Textile Conductive Ribbon", <i>University of West Bohemia, Gymnazium Plzen (CZ)</i>	335
53	Teemu Salo et al. "3D-Printed Wearable and Programmable Surface Reflectance Sensor", <i>Tampere University (FI)</i>	339
54	Shahood uz Zaman et al. "Advanced Electrospun Membrane for Comprehensive Strain Detection ", <i>National Textile University (PK), University of Montreal (CA), University of Lille (FR)</i>	345
55	Bahareh Ghalebi et al. "Designing a Textile-based One-flag Piezoelectric and Triboelectric Nanogenerator for Harvesting Wind Energy", <i>Isfahan University of Technology, University of Isfahan (IR)</i>	350
56	Bahareh Ghalebi et al. "Multifunctional embroidered triboelectric Human-Machine Interface (HMI)", <i>Isfahan University of Technology</i>	355