

Sensors Expo & Conference 2017

San Jose, California, USA
27 - 29 June 2017

Volume 1 of 2

ISBN: 978-1-5108-5322-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2017) by Questex Media Group, Inc.
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact Questex Media Group, Inc.
at the address below.

Questex Media Group, Inc.
275 Grove Street, Suite 2-130
Newton, Massachusetts 02466
USA

Phone: (617) 219-8300

info@questex.com

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
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

ARM - ACCELERATING IOT ADOPTION	1
<i>C. Marini</i>	
THE “BUILDING” OF INTERNET OF THINGS TO “EVERYTHING”	16
<i>C. Bramel</i>	
PURPOSE DRIVEN SENSORS FOR THE INTERNET OF THINGS	29
<i>B. Cisneros</i>	
BLUECOIN: THE ROBOTIC EAR	42
<i>E. Gallizio</i>	
SMART LIVING & MEDICAL WELLNESS: WEARABLES MONITORING COUGH CHANGES	51
<i>S. Schmidt</i>	
PANEL DISCUSSION - YOLO	62
<i>G. Girardin</i>	
IOT REVELATIONS	70
<i>K. Krewell</i>	
MACHINE HEARING: AUDIO IS KEY TO AI USAGE	75
<i>P. Cooney</i>	
OUR HISTORY - MEET KURI	80
<i>B. Kearns</i>	
MAKING MORE-FROM-MOORE IN THE INTERNET OF THINGS	90
<i>S. Nelson</i>	
NEXT GENERATION SENSOR FUSION GOING BEYOND 9-AXIS	104
<i>D. Margiotta</i>	
GETTING FROM SENSORS TO INSIGHT TO OUTCOMES TO SERVE HUMANITY SUSTAINABLY	109
<i>P. Ranjan</i>	
LOW POWER SENSORS FOR SPORTS AND VITALITY APPLICATIONS	124
<i>S. Brongersma</i>	
ELECTROCHEMICAL SENSORS - A VERSATILE FLUIDIC AND GAS MONITORING PLATFORM	140
<i>N/A</i>	
ACHIEVING MEDICAL ACCURACY FOR A MODULE SENSING ALL 5 VITAL SIGNS IN A SMARTPHONE	152
<i>M.-E. Jones</i>	
CONSIDERATIONS TO BUILD A SENSOR-TO-CLOUD PROOF OF CONCEPT	160
<i>W. Florentino</i>	
MANUFACTURING CHALLENGES IN THE CREATION OF PRINTED FLEXIBLE SENSORS AND ELECTRONICS	170
<i>A. Busnaina</i>	
BRINGING ADVANCED MEMS TECHNOLOGIES FROM CONCEPT TO MARKET	192
<i>M. Gemelli</i>	
MOTUS	199
<i>B. Hansen</i>	
PLUG & PRAY - ENABLERS AND BARRIERS FOR LARGE SCALE IIOT DEPLOYMENTS	219
<i>Y. Poleg</i>	
STORAGE, EDGE, CLOUD, STREAMING (AKA SECS) - RELATIONSHIP STATUS: IT’S COMPLICATED	236
<i>D. Black</i>	
DESIGN CONSIDERATIONS IN THE DEVELOPMENT OF A MODULAR, FLEXIBLE SENSOR BASED, GAIT ANALYSIS PLATFORM	250
<i>R. Podoloff</i>	
DEVELOPMENT AND APPLICATIONS OF NOVEL FLEXIBLE SENSORS AND ELECTRONICS	269
<i>M. Atashbar, B. Narakathu</i>	
DEVELOPMENT OF MEMS-BASED CAPACITIVE ULTRASONIC TRANSDUCERS - TECHNOLOGY, APPLICATIONS AND PERSPECTIVES FOR ULTRASONIC SENSING	283
<i>M. Kircher</i>	

REMOTE AND INACCESSIBLE WIRELESS SENSOR STRATEGY TO ACHIEVE LONG BATTERY LIFE	295
<i>H. Morales</i>	
BATTERY-FREE WIRELESS EMBEDDED STRAIN SENSING TECHNOLOGY ADVANCEMENTS AND APPLICATION EXAMPLES	305
<i>S. Dagleish</i>	
DEVELOPMENT OF ULTRA LOW-POWER SELF-POWERED SYSTEMS - STRATEGIES FOR SYSTEM OPTIMIZATION	315
<i>M. Farrington, P. Perrault</i>	
NEXT GEN. BATTERY DRIVEN SENSOR DEVICES	331
<i>M. Malkowski</i>	
WIRELESS POWER, ENERGY HARVESTING, & POWER MANAGEMENT SOLUTIONS FOR SENSORS AND THE IOT	353
<i>C. Greene</i>	
MINIMIZING THE COMPLEXITY OF HARDWARE CODE AND CLOUD DEVELOPMENT FOR WIRELESS EMBEDDED DEVICES	369
<i>M. Dani</i>	
RTOS DESIGN TECHNIQUES FOR SENSOR BASED SYSTEMS	378
<i>J. Beningo</i>	
IS YOUR DATA ACQUISITION SYSTEM READY FOR BIG ANALOG DATA?	392
<i>A. Warren</i>	
ENABLING INNOVATION FOR THE IOT LONG-TAIL	409
<i>N. Sauvage</i>	
ENERGY STORAGE SOLUTIONS FOR MINIATURE SENSOR DEVICES	418
<i>J. Sather</i>	
SENSING THE VR AND AR MARKET	428
<i>A. Macklin</i>	
DEEP LEARNING-BASED EMOTION RECOGNITION VISION AI	441
<i>M. Alaoui</i>	
SCALABLE ANOMALY, DETECTION WITH HTM NETWORKS	454
<i>M. LeBorgne</i>	
SENSING AND IOT ECOSYSTEM: OPPORTUNITIES AT A NATIONAL RESEARCH LABORATORY	469
<i>O. Ahmed</i>	
EVOLUTION OF FLEXIBLE, STRETCHABLE AND CONFORMABLE CAPACITIVE TACTILE SENSORS	483
<i>J. Son</i>	
FULLY FLEXIBLE ELECTRONIC DEVICES INCLUDING TEXTILE INTERACTIVE FORCE SENSING AND ACTUATOR MATS	502
<i>N/A</i>	
ADDING A VOICE COMMAND INTERFACE TO FITNESS, MEDICAL AND WEARABLE PRODUCTS	514
<i>M. Buccini</i>	
OPTICAL HEART RATE MONITORING FOR WEARABLE CONSUMER AND MEDICAL DEVICES	530
<i>C. Easson</i>	
NEXT GENERATION BIOMETRIC SENSING IN WEARABLE DEVICES	543
<i>C. Tompkins</i>	

VOLUME 2

COMMERCIALIZATION OPPORTUNITIES AND STRATEGIES FOR PRINTED / FLEXIBLE / STRETCHABLE AND FUNCTIONAL FABRIC SENSORS FOR WEARABLES AND IOT APPLICATIONS	556
<i>R. Grace</i>	
5G ENABLES IOT	587
<i>K. Krewell</i>	
BUILDING A SMART CITY	601
<i>M. Willenbrink</i>	

IOT5: SOLVING IOT COST , SIZE, AND POWER HEADACHES - EVOLVING DESIGNS WITH CONFIGURABLE MIXED-SIGNAL DEVICES	612
<i>D. Chow</i>	
USING AI WITH SENSOR & SIGNAL DATA AT THE EDGE AND IN THE CLOUD	632
<i>S. Feffer</i>	
SHORT RANGE RADAR AS AN IOT SENSOR.....	644
<i>R. Frizzell</i>	
MAXIMIZING LTE TECHNOLOGY FOR SENSOR NETWORKS.....	653
<i>B. Nelson</i>	
ULTRA-FAST, HIGHLY SENSITIVE PRINTED MOISTURE SENSORS FOR HIGH-SPEED SENSING APPLICATIONS.....	662
<i>V. Kayastha</i>	
LESSONS FROM THE DESIGN, DEVELOPMENT AND TEST OF A SIGNAL CONDITIONED ULTRA LOW PRESSURE SENSOR	673
<i>G. Sprakelaar</i>	
A SENSOR ECO SYSTEM FOR INDOOR AIR QUALITY MONITORING	690
<i>P. Wilson</i>	
MEMS SENSORS: WHAT'S NEXT.....	702
<i>J.-P. Polizzi</i>	
UTILIZING ULTRA-LOW POWER MEMS SENSORS TO REALIZE INTELLIGENT REAL-TIME ASSET HEALTH MONITORING	733
<i>W. Meyer</i>	
MEMS OPTICAL PHASED ARRAY FOR LIDAR	745
<i>Y. Wang, M. Wu</i>	
“INTERNET OF TOMATOES” PRECISION AG SYSTEM APPROACH.....	759
<i>R. O'Reilly</i>	
SOLID STATE LIDAR: ENABLING MASS ADOPTION IN MULTIPLE INDUSTRY SECTORS	770
<i>W. Appelman</i>	
FIBER OPTIC SENSING A VISIBLE ALTERNATIVE	784
<i>N. Burgwin</i>	
AUTOMOTIVE & AUTONOMOUS VEHICLE SENSOR WORKSHOP	800
<i>B. Shulkin, G. Ballew, R. Pattula</i>	
SENSOR EXPO - MAGNA	808
<i>B. Shulkin</i>	
ARM® IN AUTOMOTIVE MARKETS	813
<i>A. Saha</i>	
SENSL QUICK FACTS	817
<i>N/A</i>	
SMART OPTIMIZATION FOR VISION SYSTEMS	825
<i>D. Tobic</i>	
CIVIL MAPS - COGNITION FOR CARS	828
<i>N/A</i>	
XCUBE R&D	837
<i>N/A</i>	
INNOVATING VISION BEYOND THE HUMAN EYE	839
<i>G. Ballew</i>	
PURPOSE DRIVEN SENSORS FOR THE INTERNET OF THINGS.....	842
<i>B. Cisneros</i>	
RELIABLE, ROBUST, STANDARD: ZIGBEE WIRELESS MESH TRANSFORMS RESOURCE-CONSTRAINED INDUSTRIAL IOT NETWORKS	855
<i>T. Richardson</i>	
DESIGN CONSIDERATIONS IN THE DEVELOPMENT OF A MODULAR, FLEXIBLE SENSOR BASED, GAIT ANALYSIS PLATFORM	869
<i>R. Podoloff</i>	
PROTECTING NETWORK EQUIPMENT - USING TRUSTED COMPUTING GROUP TECHNOLOGY	888
<i>G. Fedorkow</i>	
MEMS SENSING FOR INDEPENDENT LIVING.....	896
<i>M. Kelsey</i>	
DESIGNING FOR FUTURE HUMAN SPACEFLIGHT	911
<i>A. Sehlke</i>	

INTEGRATION CHALLENGES OF FLEXIBLE MAGNETIC SENSORS	924
<i>S. Freitas, D. Leitaó, P. Ribeiro, J. Gaspar, J. Valadeiro, M. Neto, R. Ferreira, P. Freitas</i>	
THE IMPACT OF IOT ON THE SENSOR MARKET	938
<i>B. O'Rourke</i>	
PRINTED AND HYBRID MANUFACTURING FOR NEXT WAVE WEARABLES	949
<i>J. Mantyjarvi</i>	
FIBER-BASED MULTIMODAL SENSORS ENABLING THE NEXT GENERATION TEXTILE INTEGRATED SYSTEMS	957
<i>A. Bozkurt, T. Ghosh, M. McKnight, T. Agcayazi, H. Kausche, A. Kapoor, K. Chatterjee</i>	
YOLK ELECTRONICS NUTRIENT	974
<i>S. Chang</i>	
INTEGRATION STRATEGIES FOR STRETCHABLE AND TEXTILE SENSOR SYSTEMS	995
<i>C. Kallmayer</i>	
THE ORGANIZATIONAL PSYCHOLOGY OF THE INTERNET OF THINGS - HOW TO USE TECHNOLOGY TO DRIVE BEHAVIORAL CHANGE	1007
<i>M. Benson</i>	
TRANSFORMING FROM A COMPONENT COMPANY TO A SOLUTIONS COMPANY - THE IMPORTANCE OF AN ECOSYSTEM	1023
<i>N/A</i>	
ULTRA-LOW POWER SYSTEM DESIGN FOR DEEPLY EMBEDDED ENERGY HARVESTING SYSTEMS	1040
<i>M. Buccini</i>	
VIBRATION ENERGY HARVESTING: BETWEEN THEORY AND REALITY	1061
<i>K. El-Rayes</i>	
CONDUCTIVE TEXTILES FOR WEARABLE ELECTRONIC APPLICATIONS	1086
<i>J. Volakis</i>	
SEMI • MSIG OVERVIEW	1102
<i>F. Shemansky</i>	
Author Index	