

IEEE

# SENSORS JOURNAL

A PUBLICATION OF THE IEEE SENSORS COUNCIL

WWW.IEEE.ORG/SENSORS

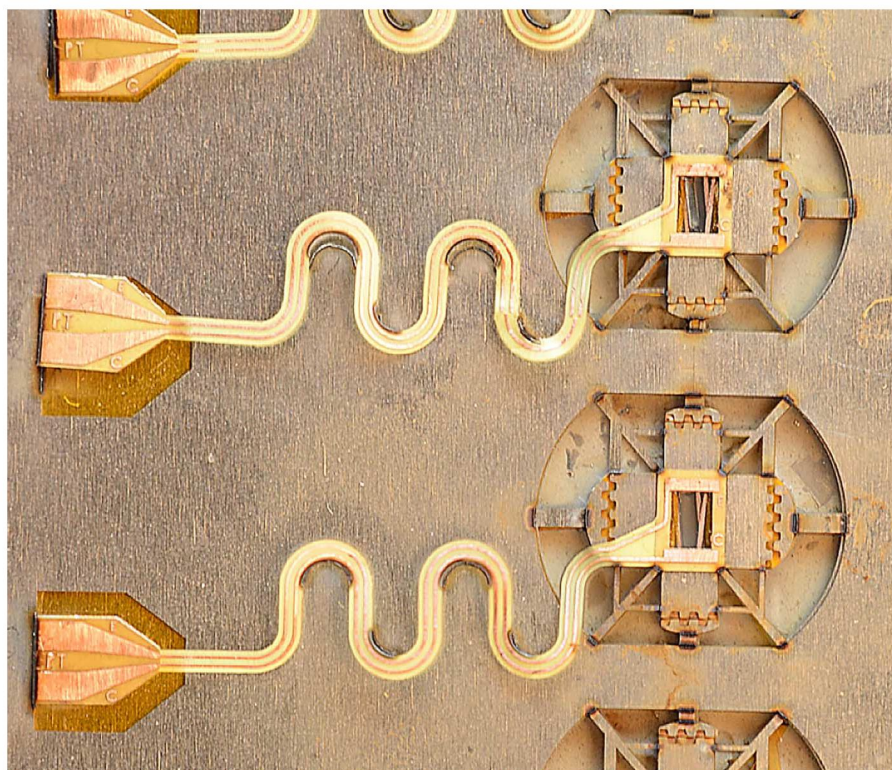
MARCH 1, 2016

VOLUME 16

NUMBER 5

ISJEAZ

(ISSN 1558-1748)



Batch fabricated mm-scale force sensors, suitable for surgical robots, prior to release and self-assembly into the final 3D shape.

IEEE

# SENSORS JOURNAL

A PUBLICATION OF THE IEEE SENSORS COUNCIL

WWW.IEEE.ORG/SENSORS

MARCH 1, 2016

VOLUME 16

NUMBER 5

ISJEAZ

(ISSN 1558-1748)

---

SENSORS PAPERS

*Chemical and Biological Sensors*

Automated Trace-Explosives Detection for Passenger and Baggage Screening .....  
..... Y. Takada, H. Nagano, Y. Kawaguchi, H. Kashima, M. Sugaya, K. Terada, Y. Hashimoto, and M. Sakairi 1119

*Mechanical Sensors*

Research on a Novel Ferrofluid Inertial Sensor With Levitating Nonmagnetic Rod ..... J. Yao, C. Huang, and D. Li 1130

Design and Characterization of a CMOS MEMS Capacitive Oscillator for Resonant Sensing in Liquids .....  
..... C.-H. Chiang, M.-C. Chou, P.-H. Hsieh, and M. S.-C. Lu 1136

A Wireless Wristband Accelerometer for Monitoring of Rubber Band Exercises .....  
..... J. S. Park, S. Robinovitch, and W. S. Kim 1143

Fabrication Process for PCBMEMS Capacitive Pressure Sensors Using the Cu Layer to Define the Gap .....  
..... M. Souilah, A. Chaabi, F. Perdignes, J. M. Quero, G. Flores, and M. R. Lain 1151

Optimization of Neural Network by Genetic Algorithm for Flowrate Determination in Multipath Ultrasonic Gas  
Flowmeter ..... L. Hu, L. Qin, K. Mao, W. Chen, and X. Fu 1158

*Magnetic Sensors*

Novel Unilateral NMR Sensor for Assessing the Aging Status of Silicone Rubber Insulator .....  
..... X. Zheng, C. Xianjun, M. Kaikai, and X. Yunfeng 1168

*Optoelectronic/Photonic Sensors*

Investigation of the Optical Modal Properties of Al<sup>3+</sup> Doped ZnO-Coated Au Waveguide for Gas Sensing Applications  
Using the Finite Element Method ..... N. T. Kejalakshmy, Kenneth T. V. Grattan, and B. M. A. Rahman 1176

A Microfluidic Chip and Dark-Field Imaging System for Size Measurement of Metal Wear Particles in Oil .....  
..... C. Haiden, T. Wopelka, M. Jech, F. Keplinger, and M. J. Vellekoop 1182

A Polar Symmetric CMOS Image Sensor for Rotation Invariant Measurement .....  
..... S. Sivaramkrishnan, C. Lee, B. Johnson, and A. Molnar 1190

*Integrated Optics/Fiber Optical Devices*

Highly Sensitive, Bloch Surface Wave D-Type Fiber Sensor .....  
..... S. Li, J. Liu, Z. Zheng, Y. Wan, W. Kong, and Y. Sun 1200

Simultaneous Measurement of Liquid Level and Temperature Using Tilted Fiber Bragg Grating .....  
..... T. Osuch, T. Jurek, K. Markowski, and K. Jędrzejewski 1205

A Miniaturized FBG Accelerometer Based on a Thin Polyurethane Shell .....  
..... J. Wang, Y. Zeng, C. Lin, Z. Hu, G. Peng, and Y. Hu 1210

Sensing Characteristics of Long-Period Fiber Gratings Written in Thinned Cladding Fiber .....  
..... Y. Zhao, Y. Liu, C. Zhou, Q. Guo, and T. Wang 1217

*Combined Sensors*

Retrofittable Machine Condition and Structural Excitation Monitoring From the Terminal Box .....  
..... C. Schantz, K. Gerhard, J. Donnal, J. Moon, B. Sievenpiper, S. Leeb, and K. Thomas 1224

---

(Contents Continued on Page 1118)

---

<i>Sensor Signal Processing and Array Sensor Fusion</i>	
Multi-Rate Distributed Fusion Estimation for Sensor Network-Based Target Tracking .....	1233
..... X. Yang, W.-A. Zhang, L. Yu, and K. Xing	
Empirical Mode Decomposition-Based Detection of Bend-Induced Error and Its Correction in a Raman Optical Fiber Distributed Temperature Sensor .....	1243
..... M. K. Saxena, S. D. V. S. J. Raju, R. Arya, R. B. Pachori, S. V. G. Ravindranath, S. Kher, and S. M. Oak	
Device-Free Human Sensing and Localization in Collaborative Human–Robot Workspaces: A Case Study .....	1253
..... S. Savazzi, V. Rampa, F. Vicentini, and M. Giussani	
Received Signal Strength-Based Robust Cooperative Localization With Dynamic Path Loss Model .....	1265
..... C. Liang and F. Wen	
<i>Sensor Systems</i>	
Acceleration and Magnetic Sensor Network for Shape Sensing .....	1271
Urban Pedestrian Navigation Using Smartphone-Based Dead Reckoning and 3-D Map-Aided GNSS .....	1281
..... L.-T. Hsu, Y. Gu, Y. Huang, and S. Kamijo	
Biocompatible Pressure Sensing Skins for Minimally Invasive Surgical Instruments .....	1294
..... V. Arabagi, O. Felfoul, A. H. Gosline, R. J. Wood, and P. E. Dupont	
Sensitivity and Error Analysis of a Coupled Micro-Resonator Array for Ultra-Sensitive Mass Detection Using Matrix Perturbation Theory .....	1304
A Regularized Ensemble of Classifiers for Sensor Drift Compensation .....	1310
A 128-Stage CMOS TDI Image Sensor With On-Chip Digital Accumulator .....	1319
Millimeter-Wave Imager With Multi-Source Noise Illumination .....	1325
..... B. Kapilevich, B. Litvak, A. Etinger, M. Anisimov, D. Hardon, and Y. Pinhasi	
<i>Applications</i>	
Hand Movements and Gestures Characterization Using Quaternion Dynamic Time Warping Technique .....	1333
..... R. Srivastava and P. Sinha	
A Maximum-Weight-Independent-Set-Based Algorithm for Reader-Coverage Collision Avoidance Arrangement in RFID Networks .....	1342
Face-Based Heart Rate Signal Decomposition and Evaluation Using Multiple Linear Regression .....	1351
..... K.-Y. Lin, D.-Y. Chen, and W.-J. Tsai	
Smartphone Enabled Intelligent Surveillance System .....	1361
BSN-Care: A Secure IoT-Based Modern Healthcare System Using Body Sensor Network .....	1368
..... P. Gope and T. Hwang	
Laser Displacement Sensor in the Application of Aero-Engine Blade Measurement .....	1377
..... B. Sun and B. Li	
<i>Sensors System Networks</i>	
Passive UWB RFID for Tag Localization: Architectures and Design .....	1385
Optimal and Near-Optimal Cooperative Routing and Power Allocation for Collision Minimization in Wireless Sensor Networks .....	1398
Tackling Mobility in Low Latency Deterministic Multihop IEEE 802.15.4e Sensor Network .....	1412
..... Y. Al-Nidawi, H. Yahya, and A. H. Kemp	
Improved Multi-Bernoulli Filter for Extended Stealth Targets Tracking Based on Sub-Random Matrices .....	1428
..... P. Zong and M. Barbary	
Design and Evaluation of a Metropolitan Air Pollution Sensing System .....	1448
..... K. Hu, V. Sivaraman, B. G. Luxan, and A. Rahman	
A Precise and Hardware-Efficient Time Synchronization Method for Wearable Wired Networks .....	1460
..... F. Derogarian, J. C. Ferreira, and V. M. G. Tavares	
Toward Optimum Crowdsensing Coverage With Guaranteed Performance .....	1471
..... M. Zhang, P. Yang, C. Tian, S. Tang, and B. Wang	

---