

27th Micromechanics and Microsystems Europe Workshop 2016

Journal of Physics: Conference Series Volume 757

Cork, Ireland
28 – 30 August 2016

Editors:

**Shashank N. Kane
Ashutosh Mishra**

Anup K. Dutta

ISBN: 978-1-5108-3225-1
ISSN: 1742-6588

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© (2016) by the Institute of Physics
All rights reserved. The material featured in this book is subject to
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

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 757

**27th Micromechanics and Microsystems Europe Workshop
28–30 August 2016, Cork, Ireland**

**Accepted papers received: 21 September 2016
Published online: 11 November 2016**

Preface

011001

OPEN ACCESS

[27th Micromechanics and Microsystems Europe Workshop](#)

011002

OPEN ACCESS

[Peer review statement](#)

Papers

012001

OPEN ACCESS

[A thin silicon thermoelectric nanowire characterization platform \(TNCP\) equipped with nanoporous electrodes for electrical contact formation](#)

S. Hoda Moosavi, Michael Kroener, Maxi Frei, Fabian Frick, Sven Kerzenmacher and Peter Woias.....1

012002

OPEN ACCESS

[Electrochemical microsensor system for cancer research on photodynamic therapy *in vitro*](#)

J Marzioch, J Kieninger, J A Sandvik, E O Pettersen, Q Peng and G Urban.....5

012003

OPEN ACCESS

[Crystalline growth of AlN thin films by atomic layer deposition](#)

S Sadeghpour, F Ceyskens and R Puers.....10

012004

OPEN ACCESS

[HF-Release of Sacrificial Layers in CMOS-integrated MOEMS structures](#)

S Döring, M Friedrichs, W Pufe and M Schulze.....15

012005

OPEN ACCESS

[Three step deep reactive ion etch for high density trench etching](#)

B Lips and R Puers.....20

012006

OPEN ACCESS

[Asymmetric resonance frequency analysis of in-plane electrothermal silicon cantilevers for nanoparticle sensors](#)

Maik Bertke, Gerry Hamdana, Wenzhe Wu, Markus Marks, Hutomo Suryo Wasisto and Erwin Peiner.....25

012007

OPEN ACCESS

[Design and Simulation of Bistable Microsystem with Frequency-up conversion effect for Electrostatic Energy Harvesting](#)

Bogdan Vysotskyi, Fabien Parrain, Elie Lefeuvre, Xavier Leroux, Denis Aubry and Philippe Gaucher.....31

012008

OPEN ACCESS

[A micropump driven by electrochemically produced short-lived bubbles](#)

I V Uvarov, S S Lemekhov, A E Melenev and V B Svetovoy.....36

012009

OPEN ACCESS

[Experimental study of PDMS mechanical properties for the optimization of polymer based flexible pressure micro-sensors](#)

T H N Dinh, E Martincic, E Dufour-Gergam and P-Y Joubert.....42

012010

OPEN ACCESS

[Single cell array impedance analysis in a microfluidic device](#)

Emre Altinagac, Selen Taskin and Huseyin Kizil.....48

012011

OPEN ACCESS

[High Aspect-Ratio Neural Probes using Conventional Blade Dicing](#)

S. B. Goncalves, J. F. Ribeiro, A. F. Silva and J. H. Correia.....54

012012

OPEN ACCESS

[Circuit Modeling of a MEMS Varactor Including Dielectric Charging Dynamics](#)

P Giouanlis, D Andrade-Miceli, S Gorreta, J Pons-Nin, M Dominguez-Pumar and E Blokhina.....58

012013

OPEN ACCESS

[Automation of Silica Bead-based Nucleic Acid Extraction on a Centrifugal Lab-on-a-Disc Platform](#)

David J Kinahan, Faith Mangwanya, Robert Garvey, Danielle WY Chung, Artur Lipinski, Lourdes AN Julius, Damien King, Mehdi Mohammadi, Rohit Mishra, May Al-Ofi, Celina Miyazaki and Jens Ducreé.....64

012014

OPEN ACCESS

[Micro system comprising 96 micro valves on a titer plate](#)

S. Krabbe, D. Flitsch, J. Büchs and W.K. Schomburg.....70

012015

OPEN ACCESS

[Design, numerical simulation and experimental investigation of an SU-8 microgripper based on the cascaded V-shaped electrothermal actuators](#)

Rodica-Cristina Voicu.....74

012016

OPEN ACCESS

[Development and fabrication of a very High-g sensor for very high impact applications](#)

Piotr Mackowiak, Biswajit Mukhopadhyay, Xiaodong Hu, Oswin Ehrmann, Klaus-Dieter Lang, Stefan Linke, Anthony Chu and Ha-Duong Ngo.....80

012017

OPEN ACCESS

[Characterizing coupled MEMS resonators with an electrical resonator](#)

Guowei Tao and Bhaskar Choubey.....87

012018

OPEN ACCESS

[Design and fabrication of 45° inclined mirrors for wafer-level optical absorption spectroscopy](#)

N P Ayerden, M Ghaderi and R F Wolffenbuttel.....92

012019

OPEN ACCESS

[Split-Ring Resonator-Based Strain Sensor on Flexible Substrates for Glaucoma Detection](#)

Gizem Ekinici, Arda Deniz Yalcinkaya, Gunhan Dunder and Hamdi Torun.....98

012020

OPEN ACCESS

[Piezoelectric MEMS resonators for monitoring grape must fermentation](#)

J Toledo, F Jiménez-Márquez, J Úbeda, V Ruiz-Díez, G Pfusterschmied, U Schmid and J L Sánchez-Rojas.....104

012021

OPEN ACCESS

[Direct 3D printed shadow mask on Silicon](#)

S Rahiminejad, E Köhler and P Enoksson.....112

012022

OPEN ACCESS

[Process flow to integrate nanostructures on silicon grass in surface micromachined systems](#)

H Mehner, L Müller, S Biermann, F Hänschke and M Hoffmann.....117

012023

OPEN ACCESS

[MEMS gas ionization sensor with palladium nanostructures for use at ambient pressure](#)

L Müller, H Mehner and M Hoffmann.....121

012024

OPEN ACCESS

[A 3D Polymer Based Printed Two-Dimensional Laser Scanner](#)

H A Oyman, Y D Gokdel, O Ferhanoglu and A D Yalcinkaya.....126

012025

OPEN ACCESS

[Alumina-based monopropellant microthruster with integrated heater, catalytic bed and temperature sensors](#)

Zahra Khaji, Lena Klintberg, Dhananjay Barbade, Kristoffer Palmer and Greger Thornell.....132

012026

OPEN ACCESS

[Evaluation of 3D printed materials used to print WR10 horn antennas](#)

Elof Köhler, Sofia Rahiminejad and Peter Enoksson.....138

012027

OPEN ACCESS

[Micro-Venturi injector: design, experimental and simulative examination](#)

S Degenhardt, Y Cheriguen, T Geiling and M Hoffmann.....143

012028

OPEN ACCESS

[Inertial focusing of microparticles and its limitations](#)

FJ Cruz, S Hooshmand Zadeh, ZG Wu and K Hjort.....149

012029

OPEN ACCESS

[Extreme-temperature lab on a chip for optogalvanic spectroscopy of ultra small samples - key components and a first integration attempt](#)

Martin Berglund, Zahra Khaji, Lena Klintberg, Anders Persson, Peter Sturesson, Johan Söderberg Breivik and Greger Thornell.....155

012030

OPEN ACCESS

[Geometric optimization of magnetically actuated MEMS micromirrors](#)

Francesco Pieri.....161

012031

OPEN ACCESS

[Magnetic Multilayer Fabrication Technology with Selective Activation of SU-8 Films](#)

R Anthony, C ÓMathúna and JF Rohan.....167

012032

OPEN ACCESS

[Design and fabrication of ultrathin silicon-nitride membranes for use in UV-visible airgap-based MEMS optical filters](#)

Mohammadmir Ghaderi and Reinoud F. Wolffenbuttel.....174

012033

OPEN ACCESS

[CMOS-compatible fabrication of metamaterial-based absorbers for the mid-IR spectral range](#)

Ehsan Karimi Shahmarvandi, Mohammad Amir Ghaderi and Reinoud F. Wolffenbuttel.....180

012034

OPEN ACCESS

[Integrated CoPtP Permanent Magnets for MEMS Electromagnetic Energy Harvesting Applications](#)

Dhiman Mallick and Saibal Roy.....186

012035

OPEN ACCESS

[MEMS Based Micro Aerial Vehicles](#)

Niranjan Joshi, Elob Köhler and Peter Enoksson.....191

012036

OPEN ACCESS

[A refined model for piezoelectric composite beams](#)

Luca Luschi and Francesco Pieri.....197

012037

OPEN ACCESS

[Frequency adjustable MEMS vibration energy harvester](#)

P Podder, P Constantinou, A Amann and S Roy.....203

012038

OPEN ACCESS

[Characterization of piezoelectric device for implanted pacemaker energy harvesting](#)

Sunny Jay, Manuel Caballero, William Quinn, John Barrett and Martin Hill.....209

012039

OPEN ACCESS

[A low frequency MEMS energy harvester scavenging energy from magnetic field surrounding an AC current-carrying wire](#)

Oskar Z. Olszewski, Ruth Houlihan, Alan Mathewson and Nathan Jackson.....215

012040

OPEN ACCESS

[Design, modelling and preliminary characterisation of microneedle-based electrodes for tissue electroporation *in vivo*](#)

Conor O'Mahony, Ruth Houlihan, Konstantin Grygoryev, Zhenfei Ning, John Williams and Tom Moore.....221

012041

OPEN ACCESS

[Location Dependence of a MEMS Electromagnetic Transducer with respect to an AC Power Source](#)

Ruth Houlihan, Oskar Olszewski, Finbarr Waldron, Mike O'Neill, Alan Mathewson and Nathan Jackson.....227

012042

OPEN ACCESS

[A novel CE microchip with micro pillars column & double-L injection design for Capacitance Coupled Contactless Conductivity detection technology](#)

Yineng Wang, Walter Messina, Xi Cao, Anna Hogan, Ed van Zalen and Eric Moore.....233