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Fiber Optic Sensors and Applications VII

**Alexis Mendez
Henry H. Du
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Eric Udd
Stephen J. Mihailov**
Editors

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Contents

vii	Conference Committee
xi	Introduction

SESSION 1 DISTRIBUTED SENSORS, SENSING SYSTEMS, AND APPLICATIONS I

- 7677 02 **Pushing the limit of the distributed Brillouin sensors for the sensing length and the spatial resolution (Invited Paper)** [7677-01]
X. Bao, H. Liang, Y. Dong, W. Li, Y. Li, L. Chen, Univ. of Ottawa (Canada)
- 7677 03 **Distributed sensing for liquid leaks and spills (Invited Paper)** [7677-02]
A. MacLean, J. McCormack, Solus Sensors Ltd. (United Kingdom); B. Culshaw, Univ. of Strathclyde (United Kingdom)
- 7677 04 **Structural integrity and damage assessment of high performance arresting cable systems using an embedded distributed fiber optic sensor (EDIFOS) system (Invited Paper)** [7677-03]
E. A. Mendoza, C. Kempen, S. Sun, Y. Esterkin, J. Prohaska, Redondo Optics, Inc. (United States); D. Bentley, Cortland Cable Co. (United States); A. Glasgow, TMT Labs. (United States); R. Campbell, Applied Fiber (United States)

SESSION 2 DISTRIBUTED SENSORS, SENSING SYSTEMS, AND APPLICATIONS II

- 7677 07 **Protection of critical infrastructure using fiber optic sensors embedded in technical textiles (Invited Paper)** [7677-05]
K. Krebber, P. Lenke, S. Liehr, N. Noether, M. Wendt, A. Wosniok, BAM Federal Institute for Materials Research and Testing (Germany)
- 7677 08 **Robust event classification for a fiber optic perimeter intrusion detection system using level crossing features and artificial neural networks** [7677-06]
S. S. Mahmoud, J. Katsifolis, Future Fibre Technologies Pty Ltd. (Australia)
- 7677 09 **Component field testing for SWPIDS: a shallow-water perimeter intrusion detection system** [7677-07]
D. C. Burnett, D. Sheaffer, Jr., Sandia National Labs. (United States)
- 7677 0A **Positioning method for dual Mach-Zehnder interferometric submarine cable security system** [7677-08]
S. Xie, M. Zhang, S. Lai, Y. Liao, Tsinghua Univ. (China)

SESSION 3 FIBER GRATING SENSORS I

- 7677 0B **Review of high-speed fiber optic grating sensor systems (Invited Paper)** [7677-09]
E. Udd, Columbia Gorge Research (United States); J. Benterou, C. May, Lawrence Livermore National Lab. (United States); S. J. Mihailov, P. Lu, Communications Research Ctr. Canada (Canada)

- 7677 OC **Structural health monitoring and impact detection for primary aircraft structures (Invited Paper)** [7677-10]
E. Kusters, T. J. van Els, Technobis Fibre Technologies (Netherlands)
- 7677 OD **A novel twin-core fiber grating sensor system and its applications** [7677-11]
Y. Li, G. M. Bubel, D. J. Kudelko, M. F. Yan, M. J. Andrejco, OFS Fitel LLC (United States)

SESSION 4 FIBER GRATING SENSORS II

- 7677 OF **Self-heated fiber Bragg grating sensors for cryogenic environments (Invited Paper)** [7677-13]
T. Chen, Univ. of Pittsburgh (United States); P. R. Swinehart, M. S. Maklad, Lake Shore Cryotronics, Inc. (United States); M. P. Buric, K. P. Chen, Univ. of Pittsburgh (United States)
- 7677 OG **High-temperature fiber Bragg grating sensors in microstructured fibers for harsh environment applications (Invited Paper)** [7677-14]
Q. Wang, C. M. Jewart, Univ. of Pittsburgh (United States); J. Canning, The Univ. of Sydney (Australia); D. Grobnc, S. J. Mihailov, Communications Research Ctr. Canada (Canada); K. P. Chen, Univ. of Pittsburgh (United States)
- 7677 OH **Regenerated fiber Bragg gratings in non-hydrogen-loaded photosensitive fibers for high-temperature sensor networks** [7677-15]
E. Lindner, Institute of Photonic Technology Jena (Germany); C. Chojetzki, Fibre Bragg Grating Sensors Technologies GmbH (Germany); M. Becker, S. Brückner, M. Rothhardt, H. Bartelt, Institute of Photonic Technology Jena (Germany)
- 7677 OI **Liquid-level sensor based on fiber Bragg grating and carbon fiber composite diaphragm** [7677-16]
D. Song, J. Zou, L.C. Pegasus (United States); Z. Wei, Stevens Institute of Technology (United States); H. Cui, L.C. Pegasus (United States)
- 7677 OJ **Analysis of temperature and strain changes profiles by using fiber Bragg grating sensors** [7677-17]
M. Etezad, M. Kahrizi, K. Khorasani, Concordia Univ. (Canada)

SESSION 5 FIBER GRATING SENSORS III

- 7677 OK **Research and application of fiber Bragg grating safety monitoring method for huge structures and equipments (Invited Paper)** [7677-18]
D. Jiang, K. Che, C. Zhou, J. Huang, D. Fan, Wuhan Univ. of Technology (China)
- 7677 OL **The design of strain rosette on fiber Bragg grating and carbon fiber laminate composite** [7677-19]
D. Song, J. Zou, D. Li, H. Cui, L.C. Pegasus (United States)
- 7677 OM **Nonintrusive FBG tube pressure transducers with high overpressure ability** [7677-20]
I. F. Saxena, K. J. Hui, Intelligent Optical Systems, Inc. (United States)

SESSION 6 SPECIALTY FIBERS AND COMPONENTS FOR SENSING

- 7677 ON **What narrow-linewidth semiconductor lasers can do for defense and security? (Invited Paper) [7677-22]**
M. Morin, S. Ayotte, C. Latrasse, M. Aubé, M. Poulin, Y. Painchaud, N. Gagnon, G. Lafrance, TeraXion Inc. (Canada)
- 7677 OO **Optical Phase Lock Loop (OPLL) with tunable frequency offset for distributed optical sensing applications [7677-43]**
V. Kupersmidt, F. Adams, Redfern Integrated Optics, Inc. (United States)
- 7677 OP **Technologies of fiber fusion and fused device fabrication for sensing applications [7677-24]**
B. S. Wang, J. Stathis, Vytran LLC (United States)
- 7677 OQ **Implementation of fiber filters based on a macrobending high-bend loss fiber utilizing the Whispering Gallery mode effect [7677-25]**
P. Wang, Y. Semenova, Q. Wu, G. Farrell, Dublin Institute of Technology (Ireland)

SESSION 7 PHYSICAL PARAMETER SENSORS AND APPLICATIONS

- 7677 OR **Review on developments in fiber optical sensors and applications [7677-26]**
K. K. K. Annamdas, Univ. of Miami (United States); V. G. M. Annamdas, Jawaharlal Nehru Technological Univ. (India)
- 7677 OS **In situ dynamic measuring system to measure the vibratory and translational displacement of the airfoil modes of a combustion turbine compressor vane via an optical noncontact method (Invited Paper) [7677-27]**
E. V. Diatzikis, M. Tartibi, M. Twerdochlib, Siemens Energy, Inc. (United States)
- 7677 OT **Intrinsic Fabry-Pérot interferometric (IFPI) fiber pressure sensor [7677-28]**
C. Ma, Virginia Polytechnic Institute and State Univ. (United States); N. Wang, China Univ. of Petroleum (China); E. M. Lally, A. Wang, Virginia Polytechnic Institute and State Univ. (United States)
- 7677 OU **Chiral fiber sensors [7677-29]**
V. I. Kopp, V. M. Churikov, J. Singer, D. Neugroschl, Chiral Photonics, Inc. (United States); A. Z. Genack, Chiral Photonics, Inc. (United States) and Queens College, CUNY (United States)

SESSION 8 ACOUSTIC SENSORS

- 7677 OW **Dynamic test of an acoustic/pressure sensor with precise cavity length control [7677-31]**
W. Wang, N. Wu, Y. Tian, C. Guthy, X. Wang, C. Niezrecki, Univ. of Massachusetts Lowell (United States)
- 7677 OX **Theoretical analysis of a novel ultrasound generator on an optical fiber tip [7677-32]**
N. Wu, W. Wang, Y. Tian, C. Guthy, X. Wang, Univ. of Massachusetts Lowell (United States)

- 7677 0Y **Simulation of a novel ultrasound generator-receiver on a single optical fiber** [7677-33]
X. Wang, Univ. of Massachusetts Lowell (United States); C. Liu, Univ. of Connecticut (United States); N. Wu, W. Wang, C. Guthy, Y. Tian, Univ. of Massachusetts Lowell (United States); C. Cao, Univ. of Connecticut (United States)

SESSION 9 PHOTONIC CRYSTAL FIBERS AND SENSORS

- 7677 10 **PCF with immobilized silver nanoparticles as an optofluidic SERS sensing platform** [7677-34]
Y. Han, S. Tan, M. K. Khaing Oo, H. H. Du, Stevens Institute of Technology (United States)
- 7677 11 **Mode coupling in photonic crystal fiber using long-period gratings for enhanced overlap of evanescent field** [7677-36]
Z. He, Stevens Institute of Technology (United States); Y. Zhu, Northwestern Univ. (United States); J. Kaňka, Institute of Photonics and Electronics (Czech Republic); D. J. Trevor, OFS Labs. (United States); H. Du, Stevens Institute of Technology (United States)

POSTER SESSION

- 7677 13 **Frequency stabilization of a 2.05- μ m laser using hollow-core fiber CO₂ frequency reference cell** [7677-38]
P. Meras, I. Y. Poberezhskiy, D. H. Chang, G. D. Spiers, Jet Propulsion Lab. (United States)
- 7677 14 **Monitoring the gaps between the platform screen doors and the doors of subway train based on optical time domain reflectrometer** [7677-39]
H. Zhang, L.C. Pegasus (United States); Z. Wei, Stevens Institute of Technology (United States); P. Wang, New York Univ. Polytechnic Institute (United States); L. Fan, L. Guan, Q. Zhao, Stevens Institute of Technology (United States); H.-L. Cui, New York Univ. Polytechnic Institute (United States)
- 7677 15 **Improvement of the accuracy of the aircraft center of gravity by employing optical fiber Bragg grating technology** [7677-40]
H. Zhang, L.C. Pegasus (United States); P. Wang, New York Univ. Polytechnic Institute (United States); L. Fan, L. Guan, Q. Zhao, Stevens Institute of Technology (United States); H.-L. Cui, New York Univ. Polytechnic Institute (United States)
- 7677 16 **Novel signal demodulation technique to estimate the amount of chirp in fiber Bragg gratings** [7677-41]
M. Kondiparthi, Indian Institute of Science (India)
- 7677 17 **High sensitive static fiber Bragg grating strain sensing using lasers locked to relative frequency reference** [7677-42]
M. Kondiparthi, Indian Institute of Science (India)

Author Index

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Younan Xia, University of Washington (United States)
Hai Xiao, Missouri University of Science and Technology (United States)

Session Chairs

- 1 Distributed Sensors, Sensing Systems, and Applications I
Alexis Mendez, MCH Engineering LLC (United States)
Katerina Krebber, Bundesanstalt für Materialforschung und -prüfung
 (Germany)
- 2 Distributed Sensors, Sensing Systems, and Applications II
Brian Culshaw, University of Strathclyde (United Kingdom)
Xiaoyi Bao, University of Ottawa (Canada)
- 3 Fiber Grating Sensors I
Stephen J. Mihailov, Communications Research Center Canada
 (Canada)
Kevin P. Chen, University of Pittsburgh (United States)
- 4 Fiber Grating Sensors II
Eric Udd, Columbia Gorge Research (United States)
Jerry J. Benterou, Lawrence Livermore National Laboratory
 (United States)
- 5 Fiber Grating Sensors III
Anbo Wang, Virginia Polytechnic Institute and State University
 (United States)
Edgar A. Mendoza, Redondo Optics, Inc. (United States)
- 6 Specialty Fibers and Components for Sensing
Hai Xiao, Missouri University of Science and Technology (United States)
Alexis Mendez, MCH Engineering LLC (United States)
- 7 Physical Parameter Sensors and Applications
Steven T. Kreger, Luna Innovations Inc. (United States)
Christopher S. Baldwin, Aither Engineering, Inc. (United States)

- 8 Acoustic Sensors
Henry H. Du, Stevens Institute of Technology (United States)
- 9 Photonic Crystal Fibers and Sensors
Henry H. Du, Stevens Institute of Technology (United States)
Gary Pickrell, Virginia Polytechnic Institute and State University
(United States)

Introduction

SPIE has been sponsoring conferences on fiber optic sensor technology for over 30 years, and the Fiber Optic Sensors and Applications VII conference continues this tradition. This conference combines the former Fiber Optic Sensors and Applications, Sensors for Harsh Environments, and Photonic Crystals and Photonic Crystal Fibers for Sensing conferences into a single major fiber optic sensor conference that covers all aspects of fiber optic sensor technology, for both civil and defense applications.

Major R&D efforts in fiber optic sensor technology have been conducted since the mid 1970s, which have led to the development, among many others, of optic acoustic sensors based on the Mach-Zehnder interferometer; fiber rotation gyro (FOG) sensors based on the Sagnac interferometer; discrete point sensors based on Fabry-Perot and fiber Bragg gratings; as well as distributed sensing techniques based on Rayleigh, Raman and Brillouin scattering techniques. Today, fiber optic sensors enjoy widespread use in a broad variety of applications and fields ranging from structural sensing and health monitoring of composites and structures in civil and aeronautic areas; to downhole pressure and temperature sensors for oil and gas reservoir monitoring; to high voltage and high current sensing systems for the power industry—to name just a few. However, new components and technology are continually being developed to support enhancement and extensions of existing fiber optic sensor technology, as well as to allow totally new innovations. New innovations—such as photonic crystals—which offer the prospect of new highly efficient light sources as well as the potential for much higher levels of performance.

Given the unique optical properties of Photonic Crystal Fibers (PCF) coupled with the development of new and improved fabrication techniques and availability of high-quality photonic bandgap crystals, has fueled the global interest in their theoretical and experimental studies. The optical properties such as bandgap and light propagation characteristics of photonic bandgap crystals and PCFs can be manipulated by structural design and defect engineering. These properties can also be altered by external stimuli that can be thermal, optical, electrical, magnetic, chemical, biological, and nuclear, etc. The great potential of photonic bandgap crystals and PCF has been well-recognized for a variety of applications.

The overall result has been a continuing revitalization of the fiber optic sensor field that is apparent in the papers that are contained in these proceedings.

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Eric Udd
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