



The 27th International Conference on **Plastic Optical Fibers**

*Conference and Exhibition: September 4th – 6th
Museum of Flight, Seattle, Washington, United States*



Conference Program

Organized by:



POF 2018 Program at a Glance

(preliminary, subject to change)

Tuesday, September 4	Wednesday, September 5	Thursday, September 6
09:00-10:30 Plenary Session	09:00-10:30 Active Optical Cables & Datacom	09:00-10:30 Materials and Fiber Technologies
10:30-11:00 Coffee Break	10:30-11:00 Coffee Break	10:30-11:00 Coffee Break
11:00-12:30 POF in Avionic Applications I	11:00-12:30 POF Sensors	11:00-12:00 Materials and Fiber Technologies II
12:30-13:30 Lunch (buffet in Skyline room)	12:30-13:30 Lunch and ICPOF Meeting (buffet in Skyline room)	12:00-12:50 Lunch (buffet in Skyline room)
13:30-15:00 POF in Avionic Applications II	13:30-15:00 POF Sensors II	12:50-13:00 Closing Remarks
15:00-15:30 Coffee Break	15:00-15:30 Coffee Break	13:00-15:00 Bus Departing Museum For Boeing Factory Tour
15:30-17:00 POF in Automobiles	15:30-17:00 Home Networking	15:00-16:30 Boeing Factory Tour
17:00-18:00 Poster Session and Exhibitor Hour Cocktail Reception	17:00-18:00 Tutorial	16:30 - 18:00 Bus Departing Boeing Factory for Embassy Suites by Hilton Hotel
18:00-19:00 Museum of Flight Guided Tour	19:00 Conference Diner	

Preliminary Program (subject to change)

Tuesday, September 4th

08:00 Registration and Continental Breakfast – Skyline Room Lobby

Plenary Session		
09:00	Welcome and Opening Remarks	
	T. Kien Truong <i>Technical Fellow – Avionics & Fiber Optics</i> <i>The Boeing Company, United States</i>	<i>POF 2018 Conference Chair</i>
09:10	Plenary Keynote: Status of Advanced POF and POF Network towards IoT Society	
	Yasuhiro Koike , <i>Director, Keio Photonics Research Institute (KPRI) and Professor, Keio University, Japan</i>	<i>Chairman of the International Cooperative on Plastic Optical Fibers</i>
09:50	Plenary Keynote Trends in Fiber Optics and Photonics for Airplane Systems	
	T. Kien Truong , <i>Technical Fellow – Avionics & Fiber Optics, The Boeing Company, United States</i>	<i>POF 2018 Conference Chair</i>

10:30 – 11:00	Coffee Break	Skyline Room
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POF in Avionic Applications I		
Chair: Kien Truong		
11:00	Invited	Unique POF Characteristics for Avionics Network & Sensing Applications <i>Kien Truong, Boeing, United States</i>
11:30		Technique To Achieve High Sensitivity Receiver for Passive Optical Network <i>Eric Chan, Boeing, United States</i>
11:50		Rugged POF Splice for Field Repair Capability in Fueled Aircraft <i>Dennis Koshinz, Boeing, United States</i>

12:10	Qualification & Certification of a New Avionics Optical Network <i>Kim Nguyen, Boeing, United States</i>
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12:30 – 13:30	Networking Lunch	Skyline Room
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POF in Avionic Applications II Chair: Kien Truong	
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13:30	Evolution of Avionics Optical Fiber & Optical Connector Standards <i>Lyndon Mazon, Boeing, United States</i>
14:00	LiFi Optical Wireless Simulation Modeling for Passenger Cabin <i>Eric Harvey, Boeing, United States</i>
14:20	Evolution of Fuel Quantity Indication System <i>Everett Groat, Boeing, United States</i>
14:40	Evolution of Integrated Modular Avionics <i>Sean Ramey, Boeing, United States</i>

15:00 – 15:30	Coffee Break	Skyline Room
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POF in Automobiles Chair: TBD	
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15:30	Invited No41	Standardization and Simulation Status Of Automotive Optical Ethernet <i>Manabu Kagami, A. Kawasaki, S. Ito, T. Yamashita, M. Soga, M. Ogawa</i> <i>Toyota Central R&D Labs., Inc., Japan</i>
16:00	Invited No42	Standardization Activities On Gigabit And Multi-Gigabit Ethernet Operation over Glass and Plastic Optical Fibers for Automotive Optical Communication <i>Okii Sugihara</i> <i>Utsunomiya University, Japan</i>
16:20	Invited	POF Technology in Automotive Applications <i>Yoshihiro Tsukamoto</i> <i>Mitsubishi Chemical Corporation, Japan</i>

16:40	No29 Star Networks with Passive Splitters and High Sensitivity Detectors <i>Juri Vinogradov, Martin Bloos, Robert Swoboda, Ahmed Al-Samaneh, Josef Wittl, Rainer Engelbrecht, Olaf Ziemann</i> <i>POF-AC, Technische Hochschule Nuernberg Georg Simon Ohm, Germany</i>
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17:00	Poster Session / Exhibitor Hour (Cocktail Reception)	Skyline Room
18:00	Museum of Flight Guided Tour	Museum of Flight
19:00	Close of Day 1	

Wednesday, September 5th

08:00 Registration and Continental Breakfast – Skyline Room Lobby

Active Optical Cables and Datacom Chair: Y Koike		
09:00	Invited No37	GI-POF in Active Optical Cables <i>Whitney White</i> <i>Chromis Fiberoptics, Inc., United States</i>
09:30	No15	Ribbon POF based HDMI 2.1 AOC Incorporating an Encapsulated Optical Engine <i>Yong-Geon Lee, Yung-Sung Son, Hyun-Ryong Cho, Soo-Geun You, and Sang-Shin Lee</i> <i>Kwangwoon University & Optomind Inc., Korea</i>
09:50	No22	Self-Optical-Isolation Effect Of Graded-Index Plastic Optical Fiber <i>Azusa Inoue and Yasuhiro Koike</i> <i>Keio University, Japan</i>
10:10	No16	Study On Optical Interface For 8K Endoscope Using GI Type POF <i>Hiroshi Takizuka(1), Toshio Chiba(2), Yasuhiro Koike(1)</i> <i>1: Keio University, Japan</i> <i>2: Kairos Co., Ltd., Japan</i>

10:30 – 11:00	Coffee Break	Skyline Room
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POF Sensors I Chair: Alexis Mendez		
11:00	Invited No47	Photo-Mechanical Devices Made in Polymer Optical Fibers <i>Mark G. Kuzyk</i> <i>Washington State University, United States</i>
11:30	Invited No34	Towards High Sensitivity FBG Strain Sensor Through The Combination Of Silica And Polymer Fibers <i>R. Oliveira, L. Bilro, R. Nogueira</i> <i>Instituto de Telecomunicações, Portugal</i>

11:50	No26	Stress Sensing Using Luminescent Dye-doped POFs <i>Rei Furukawa and So Kamimura</i> <i>University of Electro-Communications, Japan</i>
12:10	No49	POF-based Rotary and Linear Position Sensor Enables New Medical and Industrial Applications <i>Robert Rickenbach, Dennis Horwitz</i> <i>Micronor Inc.</i>

12:30 – 13:30	Networking Lunch ICPOF Meeting	Skyline Room Lockwood Boardroom
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POF Sensors II Chair: <i>Rogério Nogueira</i>		
13:30	Invited No38	Biomedical Applications of POF Devices and Sensors <i>Alexis Mendez</i> <i>MCH Engineering, LLC, United States</i>
14:00	Invited No14	POF - Sensors Applications <i>Regina Célia Allil</i> <i>Federal University of Rio de Janeiro, Brazil</i>
14:20	No36	Refractometric Sensor in Polymer Optical Fibers <i>X. Hu⁽¹⁾⁽²⁾, B. Luo⁽³⁾, C. Caucheteur⁽²⁾, M. Zhao^{(3)*}, C.-F. J. Pun⁽⁴⁾, N. Zhong⁽³⁾, H.-Y. Tam⁽⁴⁾, S. Fang⁽¹⁾</i> <i>1: Chongqing Century COPTICOMM Technology Industrial Co., Ltd., China</i> <i>2: Université de Mons, Belgium</i> <i>3: Chongqing University of Technology, China</i> <i>4: The Hong Kong Polytechnic University, Hong Kong, China</i>
14:40	Invited No32	Optically Remote POF Powered Temperature Sensor with 1000 Measurements per Second <i>Olaf Ziemann, Jakob Fischer, Michael Luber, Rainer Engelbrecht, Peter Urbanek, Holger Lenkowski, Magnus Ahlstedt, Christian Gärtner, Josef Wittl, Ulrich Wetzel</i> <i>POF-AC, Technische Hochschule Nuernberg Georg Simon Ohm, Germany</i>
15:00	Invited No31	Distributed Strain Sensing for Geotextiles in Soil with POF and Photon-Counting OTDR

Rainer Engelbrecht¹, Michael Luber¹, Martin Gehrke¹, Juri Vinogradov¹, Hartmut Hangen², Rainer Worbes³

1: Polymer Optical Fiber Application Center (POF-AC), Technische Hochschule Nürnberg Georg Simon Ohm, Germany

2: HUESKER Synthetic GmbH, Germany

3: Institute for Geotechnical Engineering, University of Stuttgart, Germany

15:20 – 15:35

Coffee Break

Skyline Room

Home Networking and Datacom

Chair: Olaf Ziemann

15:35

Invited
No50

POF for Gigabit Home Networking - User Cases and Perspectives from Europe

Josef Faller

homefibre digital network GmbH, Austria

16:00

No28

Gigabit Transmission over Standard POF beyond 50 m

Roman Kruglov, Juri Vinogradov, Olaf Ziemann

POF-AC, Technische Hochschule Nuernberg Georg Simon Ohm, Germany

16:20

No43

From 1Mb to 1Gbps on POF

Ken Applebaum, Rex Radabaugh

COTSWORKS, United States

16:40

No25

High-Quality Multi-Channel TV Broadcast Signal Transmission Using Low-Noise Graded-Index Plastic Optical Fiber for 4K/8K Era

K. Nishiyama, A. Inoue, Y. Koike

Keio University, Japan

17:00

Tutorial

POF: Fibers, Cables, Transmitters, Receivers, Sensors, and Standards

Prof. Olaf Ziemann and Prof. Rainer Engelbrecht

POF-AC, Technische Hochschule Nürnberg Georg Simon Ohm, Germany

18:00

Close of Day 2

19:00 - 21:00

Conference Dinner

Thursday, September 6th

08:00 Registration and Continental Breakfast – Skyline Room Lobby

Materials and Fiber Technologies I Chair: Ann Mescher		
09:00	Invited No46	Thermal Effects during Solid and Hollow Core Polymer Fiber Drawing <i>Spencer Grange, Heather Dillon, Ann Mescher</i> <i>University of Washington, United States</i>
09:30	No35	Process for Extrusion of Laser Active Single Mode Polymer Optical Fibers <i>Daniel Schrein, Bechir Hachicha, Ludger Overmeyer</i> <i>Leibniz Universität Hannover, Germany</i>
09:50	No10	Modelling of Eu-doped POF Amplifiers And Comparison With Experiment And Theory <i>Jon Arrue, B. García-Ramiro, F. Jiménez, M.A. Illarramendi, I. Ayesta, J. Zubia, D. Zaremba, R. Evert, And H-H. Johannes</i> <i>University of the Basque Country (UPV/EHU), Spain</i>
10:10	No44	Hollow-Core Fiber Manufactured from 3-D Printed Preforms <i>Brek Meuris, Ruth Ann Mullen, Cody Moody, Ann Mescher</i> <i>University of Washington, United States</i>

10:30 - 11:00	Coffee Break	Skyline Room
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Test and Measurements Chair: Rainer Engelbrecht		
11:00	No40	Changes in MPD of step-index POF Due To Wiring Conditions <i>Satoshi Takahashi¹, Masahiro Uchida², Okihiko Sugihara²</i> <i>1 POF Promotion, Japan</i> <i>2. Utsunomiya university, Japan</i>
11:30	No39	Plastic Optical Fibers (POFs) Applied As Light Conductors In Digital Fourier Transform Holography <i>Luma Macieira, Rosembergue B. da Rocha Freire Jr., Paulo A.M. dos Santos, Ricardo M. Ribeiro</i>

Universidade Federal Fluminense, Brazil

12:00 – 12:50	Networking Lunch	Skyline Room
12:50 – 13:00	Closing Remarks	Skyline Room

13:00 – 15:00	Bus Departing Museum of Flight for Boeing Factory Tour	Meet bus in front of Museum of Flight or Meet the Group at Future of Flight Aviation Center & Boeing Tour by 14:30
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15:00 – 16:30	Boeing Factory Tour	Future of Flight Aviation Center & Boeing Tour
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16:30 – 18:00	Bus Departing Boeing Factory Tour for Embassy Suites by Hilton Hotel with stop near downtown Seattle	Meet Bus in Parking Lot after Boeing Tour
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18:00	Conference Concludes	See you at POF 2019!
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Poster session

Skyline Room

Paper

1

POF in Optical MDU and Optical LAN applications

Dr. Yuxin (Eugene) Dai (1), Wei Dai (2)

1 Cox Communications, 6305 Peachtree Dunwoody Rd., Atlanta USA

2 Appfolio, 50 Castilian, Santa Barbara CA, USA

2

PLASTIC OPTICAL FIBER SENSOR WITH GOLD NANOPARTICLES FOR BIOCHEMICAL APPLICATIONS

Andrade, Andressa; Arcas, Ariadny; Werneck, Marcelo; Allil, Regina.

Federal University of Rio de Janeiro, Brazil

3

An Improved In-Line Optical Power Meter for PMMA-based Polymer Optical Fibre Links

Fábio L. Castro, Vinicius N.H. Silva, Andrés P.L. Barbero and Ricardo M. Ribeiro

Universidade Federal Fluminense, Brazil

4

Upconverting POF by Incubation of β -NaYF₄:Yb³⁺, Er³⁺ Nanoparticles via *in situ* Polymerization for Production of active Polymer Optical Fibers

L. Neumann(1), F. Jakobs(1), S. Spelthann(2), D. Zaremba(1), S. Radunz(3), U. Resch-

Genger(3), R. Evert(1), W. Kowalsky(1), H.-H. Johannes(1)

1: Technische Universität Braunschweig, Germany

2: Leibniz Universität Hannover, Germany

3: Bundesanstalt für Materialforschung und -prüfung, Germany

7

FUNCTIONALIZED POF H₂S SENSOR

M.M. Keley⁽¹⁾, A. Dante⁽¹⁾, F. Dutra⁽²⁾, R.C.S.B. Allil⁽¹⁾, C.C. Carvalho⁽¹⁾, M.M. Werneck⁽¹⁾

1: Photonics and Instrumentation Laboratory, Electric Engineering Program, COPPE, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

2: PETROBRAS[®] S.A.

8

EXPERIMENTAL CHARACTERIZATION OF THE INDIVIDUAL CORES OF MULTI-CORE PLASTIC OPTICAL FIBERS

M. Chueca (1), M. A. Losada (1), A. López (1), J. Mateo (1), J. Zubia (2), C. Vázquez (3)

University of Zaragoza, Spain

1: Aragón Institute of Engineering Research (i3A), Universidad de Zaragoza, 50018 Zaragoza, Spain

2: Departamento de Ingeniería de Comunicaciones, ETSI/Universidad del País Vasco, Euskal-

Herriko Unibertsitatea, 48013 Bilbao, Spain

3: Departamento de Tecnología Electrónica, Universidad Carlos III de Madrid, 28911

Leganes (Madrid), Spain.

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EXPERIMENTAL CHARACTERIZATION OF A CUSTOM-MADE BLOCKING-STYLE POF ATTENUATOR

S. Porroche (1), M. A. Losada (1)*, A. López (1), J. Mateo (1), X. Jiang (2), D. Richards (2), N. Antoniadis (2)

1: Aragón Institute of Engineering Research (i3A), Universidad de Zaragoza, 50018 Zaragoza, Spain

2: Department of Engineering and Environmental Science, City University of NY, The College of Staten Island, Staten Island, NY 10314 USA

11 HALOGEN FREE, ALL COPOLYMER HIGH-TEMPERATURE-POFS

D. Zaremba, R. Evert, F. Jakobs, L. Neumann, R. Caspary, W. Kowalsky, H.-H. Johannes.
Institut für Hochfrequenztechnik, TU Braunschweig, Schleinitzstraße 22, 38106 Braunschweig, Germany

12 POLYMERIZABLE COUMARINE DYES FOR EFFICIENT ACTIVE POFS

Markus Beckers¹, Magdalena Plümpe¹, Benjamin Mohr¹, Gunnar Seide¹, Thomas Gries¹, Christian Bunge²

F. Jakobs, K. Harms, D. Zaremba, J. Rodziewicz, W. Kowalsky, H.-H. Johannes
Institut für Hochfrequenztechnik, TU Braunschweig, Schleinitzstraße 22, 38106 Braunschweig, Germany

13 MICROMACHINING OF DIFFRACTION GRATING IN PMMA-POF FOR APPLICATIONS IN LOW COST SENSORS

D. Pallarés-Aldeiturriaga (1), M. Lomer (1,2,3), J. Mateo (4) and L. Rodríguez-Cobo (2)

1: Photonics Engineering Group, University of Cantabria, 39005, Santander (Spain)

2: CIBER-bbn, Instituto de Salud Carlos III, 28029, Madrid (Spain)

3: Instituto de Investigación Sanitaria Valdecilla (IDIVAL), Cantabria, Spain

4: Aragón Institute of Engineering Research, Dep. of Electronic Eng., University of Zaragoza, Spain.

17 COMPARATIVE ANALYSIS BETWEEN REFRACTIVE INDEX POF SENSORS FOR CHEMICAL SENSING

F. Sequeira(1,2), N. Cennamo(3), A. Rudnitskaya(2,4), R. Nogueira(1), L. Zeni(3), L. Bilro(1,5)
Instituto de Telecomunicações, Portugal

1: Instituto de Telecomunicações, Aveiro, Portugal.

2: CESAM, University of Aveiro, Aveiro, Portugal.

3: Department of Engineering, University of Campania Luigi Vanvitelli, Aversa, Italy.

4: Department of Chemistry, University of Aveiro, Aveiro, Portugal

5: I3N/FSCOSD, Department of Physics, University of Aveiro, Aveiro, Portugal.

19 Experimental demonstration of multiband CAP modulation for SI-POF links

J. A. Altabas ^{(1)*}, D. Izquierdo ^(1,2), A. López ⁽¹⁾, M. A Losada ⁽¹⁾, J. Clemente ⁽¹⁾, S. Sarmiento ⁽³⁾, J. Mateo ⁽¹⁾, J. A. Lazaro ⁽³⁾, I. Garces ⁽¹⁾

1: Aragon Institute of Engineering Research (I3A), Universidad de Zaragoza, E-50018, Zaragoza, Spain

2: Centro Universitario de la Defensa, E-50090, Zaragoza, Spain

3: Universitat Politècnica de Catalunya, E-08034, Barcelona, Spain

20 Characterization for simultaneous Gigabit data transmission and energy delivery in Large core Plastic Optical Fibers

C. Vázquez^{1}, Fahad M. A. Al-Zubaidi¹, D. S. Montero¹, P. C. Lallana¹, P. J. Pinzón¹, J. Mateo² and J. Zubia³*

1: Electronics Technology Department, Carlos III University of Madrid, Avda. Universidad 30, 28911 Leganés, Spain

2: Aragón Institute of Engineering Research (i3A), Universidad de Zaragoza, 50018 Zaragoza, Spain.

3: Communication Engineering Department, ETSI/Basque Country University, 48013 Bilbao, Spain.

- 21 Solar Tracker Development Based on POFs and Fresnel Lens Concentration Applied to Microalgae Cultivation Illumination**
Alexandre Silva Allil, Igor Vital Rodrigues, Alfredo Omar Córdoba Manchego, Yordanka Reyes Cruz, Cesar Cosenza de Carvalho, Regina Célia da Silva Barros Allil, Alex Dante, Arthur Werneck and Marcelo Martins Werneck.
Universidade Federal do Rio de Janeiro (UFRJ), Brazil
- 23 Development of Optical Module Based on Ballpoint-pen Connector for Graded-index Plastic Optical Fiber**
F. Kobayashi, A. Inoue, and Y. Koike
Keio University, Japan
- 24 Design of Microscopic Heterogeneous Structure in Core Polymer Matrix for Enhancement of Noise Reduction Effects of Graded-index Plastic Optical Fiber**
T. Akashi, A. Inoue, Y. Koike
Keio University, Japan
- 27 FREE SPACE AND POF BASED DISTANCE SENSORS BY PHASE MEASUREMENTS**
J. Vinogradov, Th. Becker, M. Luber, R. Engelbrecht, O. Ziemann
Polymer Optical Fiber Application Center (POF-AC), Technische Hochschule Nürnberg Georg Simon Ohm, Wassertorstraße 10, 90489 Nuremberg, Germany
- 30 A LOW-COST FIBER-OPTIC TEMPERATURE SENSOR BASED ON RUBY FLUORESCENCE LIFETIME AND A SIMPLE MICROCONTROLLER BOARD**
Rainer Engelbrecht, Timo Salberg, Alexander Bachmann, Olaf Ziemann
Polymer Optical Fiber Application Center (POF-AC), Technische Hochschule Nürnberg Georg Simon Ohm, Wassertorstraße 10, 90489 Nuremberg, Germany.
- 33 20 Years old POF – How Good are the old Ones**
Olaf Ziemann, Michael Luber, Philipp Küffner, Andreas Fiegl
1 Technische Hochschule Nürnberg Georg Simon Ohm
- 45 High Numerical Aperture Step-Index, Liquid Core Fiber**
John Choi, Ann Mescher
University of Washington