

**IWCS**



THE  
**International  
Cable • Connectivity  
Symposium**

Sponsored by IWCS, Inc. & IICIT, Inc.

# FINAL PROGRAM

60<sup>th</sup> International Cable • Connectivity Symposium

*Leadership & Vision for 60 Years*



**Charlotte Convention Center**

501 S. College St.  
Charlotte, NC 28202

**November 6-9, 2011**

# WELCOME BACK TO CHARLOTTE

The IWCS/IICIT is pleased to welcome delegates back to exciting Charlotte, North Carolina. This is our second visit to Charlotte, after a very successful and enjoyable event in 2009. The area surrounding Charlotte is home to some of the largest wire and cable manufacturers in the US, with their attendant suppliers and services. Charlotte has proven to be a popular location for our conference, making an excellent partner for Providence.

The IWCS reaches a milestone in 2011, celebrating its 60th anniversary of service to the wire and cable and connectivity industries. We have planned a special event to commemorate this achievement, inviting all attendees to a reception in the NASCAR Hall of Fame on Monday evening. We hope that all can join us in this new and fascinating facility that showcases a uniquely American sport. The Executive Track presents, once again, information you need in managing your business. Views of the marketplace and the economy are keys to the planning process. Once again in 2011, a panel of industry executives will offer an informal discussion of the industry and its prospects for the future. The panel session has been scheduled to enable delegates to attend without program conflicts.

Next year we will be back in Providence, at the Rhode Island Convention Center. We have a loyal following in Providence and are looking forward to, once again, enjoying the fine hospitality that the city offers. I wish you a valuable and enjoyable experience in the 60th IWCS International Cable • Connectivity Symposium, and look forward to seeing you next year for the 61st IWCS International Cable • Connectivity Symposium.

*John T. Barteld, CEO/Director*

## PROFESSIONAL DEVELOPMENT PROGRAM

We are continuing to update our Professional Development Program. This year we are introducing new courses in the issues and technologies of high concern and interest to the industry. This is in addition to the core courses in fiber, copper and materials. The three core courses will provide those new to wire and cable with basic technology information. The elective courses will deliver current, leading edge topics geared at providing information on new areas of interest to engineers, scientists, and other wire and cable professionals. This format offers participants the opportunity to complete the whole program of courses.

## TECHNICAL SYMPOSIUM

The cornerstone of our Conference, the IWCS Technical Symposium is recognized around the world as the premier technical symposium for wire & cable. In this, our 60th year, we will again present nearly 100 new and previously unpublished papers on research and development for wire & cable materials and connector/interconnect technologies, designs, components, fabrication, performance, testing and applications. Sessions will begin on Monday morning and end on Wednesday at mid-day.

## PLENARY SESSION TO SHOWCASE OUR INDUSTRY

The Plenary Session, open to all Technical Symposium registered attendees, will feature presentations from a leading figure in communications policy in the US. Dr. Blair Levin is a former staff director of the Federal Communications Commission, and fully conversant on issues such as broadband expansion, net neutrality and other issues impacting the demand for infrastructure. Mr Phil Gilchrist, CTO of TE Connectivity, and a long term technical leader at Motorola, will address the convergence of technologies to deliver solutions in the connectivity space. Both speakers are

experts in their fields and will offer provocative information for delegates.

The plenary session will also feature recognition for the best papers and presenter of 2010.

## FOCUS SUPPLIERS' EXHIBITION™ AND NEW PRODUCT PRESENTATIONS

The IWCS Focus Suppliers' Exhibition™ will include over 120 exhibits providing interaction among users and suppliers, to learn about product developments and user applications. Also, the New Product Presentations provide an opportunity for suppliers to report on new commercial products. The schedule for these presentations will be included in the registration package at the Conference.

## CONFERENCE REGISTRATION

Registration for all aspects of the IWCS International Cable • Connectivity Symposium can be accomplished through our web site ([www.iwcs.org](http://www.iwcs.org)), by facsimile or mail, or in person at the Conference. Specific information on both registration and hotel reservations is included on our web site.

## IWCS INTERNATIONAL CABLE • CONNECTIVITY SYMPOSIUM 2012

Please make note of the dates for the 2012 IWCS International Cable • Connectivity Symposium, November 11 to 14 at the Rhode Island Convention Center, Providence, RI, USA.

## THANK YOU TO OUR 60<sup>TH</sup> SCHOLARSHIP DONORS

Cable Components Group  
DSM  
GSA Optimum  
Sumitomo Electric Lightwave  
Teijin Aramid USA, Inc.

Carris Reels  
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# PLENARY SESSION

## CHAIRMEN



**ROBERT A. WESSELS, JR.**  
Chairman of the Board, IWCS, Inc.  
CommScope, Inc.  
Claremont, NC



**HÉLIO J. DURIGAN**  
Chairman, IWCS Symposium Committee  
Furukawa Industrial S.A. Produtos Elétricos  
Curitiba, Brazil

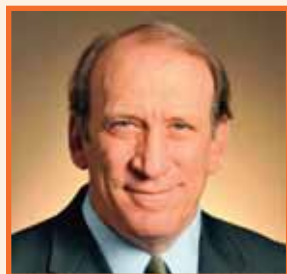


**DAVID B. KIDDOO**  
Chairman IWCS, Program Committee  
AlphaGary Corp.  
Leominster, MA

## KEYNOTE SPEAKERS

### Dr. Blair Levin

Communications and Society Fellow  
The Aspen Institute, Washington, DC, USA



Blair Levin became Communications & Society Fellow with the Aspen Institute after serving as Executive Director of the National Broadband Planning effort. He is currently Executive Director of Gig.U, a project within the Institute that seeks to accelerate the deployment of next generation networks and services by using university communities as test-beds.

Previously, he had spent eight years as an equity analyst at Legg Mason and Stifel Nicolaus. As Barron's Magazine noted, Levin "has always been on top of developing trends and policy shifts in media and telecommunications ... and has proved visionary in getting out in front of many of today's headline making events."

Mr. Levin also served as Chief of Staff to FCC Chairman Reed Hundt from 1993 through 1997. Prior to that Mr. Levin practiced law in North Carolina. He is a graduate of Yale College and Yale Law School.

### Philip Gilchrist

Chief Technology Officer and Vice President  
TE Connectivity, Greensboro, NC, USA



Philip Gilchrist is the chief technology officer and vice president for the Enterprise Networks business unit of TE Connectivity, one of the world's largest providers of engineered electronic components, network solutions, undersea telecommunication system, energy systems and wireless systems. With 2010 sales of US \$12 billion, TE has approximately 100,000 employees in 50 countries.

Phil holds a Bachelor of Arts degree with honors in Computer & Information Sciences from Stirling University in Scotland. He is a graduate of the Kellogg Business School Chairman's Leadership Institute and was recently a member of the University of Illinois Chicago Engineering Advisory Board. Phil's office is in the Enterprise Networks headquarters facility in Greensboro, North Carolina.

# PROFESSIONAL DEVELOPMENT COURSES

Within the program of the IWCS Conference an opportunity is presented to advance the knowledge and education of industry participants through Professional Development Courses, led by industry experts. The offerings include basic concepts in core courses related to copper, fiber and materials. Additionally, courses are offered in the latest technology issues facing the industry, allowing participants to be fully briefed on current issues. For the seventh year, IWCS will present the core courses of Copper 101, Fiber 101 and Materials 101. Over time, students completing those courses, along with two electives, will be presented with an IWCS Professional Development plaque. The first students to successfully complete the program were awarded such plaques at IWCS in November, 2008. Please check the IWCS website for further or changed offerings in the curriculum, [www.iwcs.org](http://www.iwcs.org).

The Courses will commence on Sunday, November 6th, 2011 at 2:00pm with four concurrent sessions. Four more concurrent sessions will continue on Monday, November 7th, 2011 at 2:00pm. Organization of the courses will allow for the maximum potential for taking two courses and are scheduled so as to allow attendees to participate both in the Courses and in the Symposium.

## SUNDAY, NOVEMBER 6, 2011 – 2:00 PM TO 6:00 PM

### 1. CU101: FUNDAMENTALS OF COPPER CONDUCTORS & METALLIC CABLE DESIGN & APPLICATIONS (MR211AB)

Instructors: Trent Hayes, Senior Engineering Manager, CommScope Incorporated, Claremont, NC, USA; Larry Bleich, Senior Engineering Manager, CommScope Incorporated, Claremont, NC, USA

#### Description

This course is an introduction to the design and application of copper conductor communications cables. Students will understand how coaxial, twisted pair and twinaxial cables are designed and how they operate upon completing the class. The instructors will provide background material on the history of copper cabling followed by sections on applications, design and construction of cables. Current standards and design examples are also reviewed by the instructors. Materials that are typically used in copper conductor communication cables will be incorporated at a fairly high level into the design exercises.

Industry professionals desiring a basic knowledge of copper cabling systems will find the course of value.

### 2. FO101: FUNDAMENTALS OF OPTICAL FIBERS & FO CABLE DESIGN & APPLICATION (MR212AB)

Instructor: David A. Seddon, Senior Engineering Associate, Corning Cable Systems LLC, Hickory, NC, USA

#### Description

This course will explore several aspects of optical fiber and cable design technology with particular focus on products for communications. It will discuss application considerations to select a product appropriate for a given installation environment and the basic considerations necessary for successful design of optical fiber cables.

The first part of this course will outline the characteristics and fundamental operating principles of optical fibers and the designs of the three basic fiber families (Single-Mode, Multimode and Non-Zero Dispersion Shifted optical fibers). Included will be critical fiber parameters and their impact on system performance. Specific topics will include the Advantages of Optical Fiber, Optical Fiber Manufacturing, Total Internal Reflection, Attenuation, Dispersion, Polarization Mode Dispersion (PMD), Cutoff Wavelength and other optical parameters critical to optical communications.

The second part of this course will explore the functional requirements of optical fiber cables and some of the fundamental design equations which can be used to ensure a cable can meet a given installation or operational requirement. We will also discuss selection of a product appropriate for a given installation environment. Structural differences between cables for indoor, outdoor, and specialty applications will be

explored including stranded loose tube cables, single tube ribbon cables, tight buffered cables and optical power ground wire cables.

The course provides a basic overview of optical fiber fundamentals and optical cable design principles to those new to the fiber optic cables.

### 3. MA101: SELECTION & USE OF MATERIALS IN WIRE & CABLE (MR219AB)

Instructors: Chester J. Kmiec, Principle Development Scientist, The Dow Chemical Company, Spring House, PA, USA; Anick G. Simon, Senior Engineer, The Dow Chemical Company, Spring House, PA, USA; Dr. Scott H. Wasserman, Associate R&D Director, The Dow Chemical Company, Spring House, PA, USA

#### Description

In this course, the selection and implementation of materials used in the construction of telecommunication wires and cables will be reviewed. The course will focus on materials utilized in Premises and Outside Plant cable applications for twisted pair, coaxial, and fiber optic cables. An overview of the materials science essential to the properties of the selected polymers and additives will be covered to level-set all attendees. Further, the fundamental characteristics (advantages and disadvantages) of materials will be presented which can be then considered in selecting a material for use in a finished cable construction. In addition, the effect of additives on material performance will also be presented, particularly those that impart ultraviolet resistant and flame retardant properties on the materials. The course will touch upon all material components of the cable's construction such as, polymers for insulating and sheathing, water blocking materials, and materials for shielding and armoring.

The course is intended for all wire and cable practitioners including raw material suppliers, cable manufacturers, and end users interested in gaining a broad understanding of applied material selection as it relates to cable performance.

### 4. MA201: THE ART AND SCIENCE OF EXTRUSION FOR WIRE AND CABLE -- Part I (MR218AB)

Instructor: Dr. Stephan Puissant, Senior Engineer, BCIAG, Switzerland

#### Description

The single screw extruder is a remarkably simple machine; the extrusion process however is extraordinarily complex as governed by interacting laws from mechanical engineering, thermodynamics, flow mechanics, the properties of solid and molten polymers etc. Physical characteristics (viscosity, conductivity, melting) of polymers used during extrusion are presented and are the keys to understand the functioning of the screw based extrusion process. For successful extrusion one must understand the transport and pressure-generation taking place in the feeding zone, and the heating and melting taking place in the

# PROFESSIONAL DEVELOPMENT COURSES

melting and conveying zones of the extruder. It will be shown how these mechanisms are affected by the polymer pellet properties, melt characteristics, screw and barrel geometry and by the pressure level at the end of the extruder. We will then present different head geometries, compare different tool designs, show how to calculate pressure- and tube-tools, and discuss the effects of mechanical adjustments and temperature settings on concentricity, adhesion and surface quality.

For each of the different items evoked in the course, practical hints are given in relation with the more theoretical approach.

This course is intended for people involved in extrusion and who want some basic analysis tools for identifying bottlenecks in the extruder and crossheads.

**MONDAY, NOVEMBER 7, 2011 – 2:00 PM TO 6:00 PM**

## **5. FO206: BEND RESISTANT SINGLE-MODE AND MULTIMODE FIBERS (MR211AB)**

Instructor: Scott R. Bickham, Ph.D., Development Associate, Corning Optical Fiber, Corning, NY, USA

### **Description**

This course starts with a brief refresher of optical waveguides that will lead into a discussion of the macrobending in optical fibers and how it can be mitigated through fiber design. The topics covered include a comparison of bend loss measurements with predictions from a modified Marcuse model that includes photoelastic contributions to the effective bend radius. Designs of bend-improved single mode fibers will also be discussed, along with their performance and applications. A new addition to the 2011 course is a section on the design and applications of bend-improved multimode fiber.

This course should give the attendee the background to assess the capability of bend-improved fibers in FTTX, Data Centers and other applications.

## **6. DC201: DATA CENTER DESIGN – PREPARING THE CABLING INFRASTRUCTURE FOR 40G AND 100G MIGRATION AND OTHER TOPICS OF ELECTRONICS AND TESTING (MR212AB)**

Instructor: David R. Kozischek, Market Manager - Data Centers, Corning Cable Systems, Hickory, NC, USA

### **Description**

The course is broken up into four (4) sections.

#### **1. Top of Rack Switching Architectures and Their Impact on Structured Cabling Infrastructure:**

Discussion of top of rack (ToR), end of row (EoR) and middle of row (MoR) architectures and how these different topologies can affect your structured cabling designs. Fiber, cable and hardware choices will be discussed along with basic information about the types of switches and optical modules that are deployed in these networks. Logical switching architectures will be discussed and how they map physical cabling and TIA-942 standards. An interactive case study will be discussed in class.

#### **2. Advanced Storage Area Network Design and its Impact on Structured Cabling Infrastructure:**

Discussion of distributed and collapsed SAN architectures and how these different topologies can affect your structured cabling designs. Fiber, cable and hardware choices will be discussed along with basic information about the types of SAN switches that are deployed in these networks. Logical SAN switching architectures will be discussed and how they map physical cabling and TIA-942 standards. An interactive case study will be discussed in class.

#### **3. Cabling your Data Center for 40G and 100G:**

Discussion of cabling and hardware choices and how to best prepare for these advanced technologies. Conversion modules for different technologies will be analyzed and compared against traditional deployments. Base-12 and Base-24 cabling systems will be discussed to show how each of these cabling systems migrates from 10G to 40G to 100G.

#### **4. Testing:**

Overview of current testing procedures will be discussed.

## **7. CN202: INTELLIGENT BUILDING INFRASTRUCTURE DESIGN (MR219AB)**

Instructors: Thomas Boucino, Manager, Strategy & Business Development, Intelligent Building SBU, CommScope Inc., Claremont, NC, USA; John Cowley, Director, Strategy & Business Development, Intelligent Building SBU, CommScope Inc., Richardson, TX, USA

### **Description**

The Intelligent Building Infrastructure Design Class will discuss intelligent & green buildings, linkage between them, applications, energy consumption, cost ramifications, building cycle & commissioning, need for technology planning, and Intelligent Building tools with the end goal of a more cost effective building for the end customer.

### **Outline:**

1. Intelligent Buildings & Applications
2. Green Buildings
3. Linkage between Green & Intelligent Buildings
4. Convergence at the physical layer
5. Intelligent Infrastructure
  - a. Applications – E911, Security
6. Power over Ethernet
7. IP migration – Security, HVAC, Lighting
8. Integrated design process & building cycle, & commissioning
9. In-building wireless – DAS
10. Design Guides
11. Case Studies

## **8. MA202: THE ART AND SCIENCE OF EXTRUSION FOR WIRE AND CABLE – Part II (MR218AB)**

Instructor: Dr. Yimsan Gau, Cable Consulting Services, Princeton, NJ, USA

### **Description**

One of the most critical steps in the fabrication of plastic parts and products and specifically wire & cable is the extrusion process. The process involves the extruder and screw as well as the properties of the materials being extruded. The course presents an overview of the extruder components, the three main functions of the extruder screws, the importance of mixing elements and their design, and the impact of material properties on the extrusion processes. This is followed by a detailed description of the different types of screws, their design concept, their advantages/disadvantages, and the fabrication lines of different type of cables and problems associated with them. The important polymer properties affecting the extrusion process and performance are also discussed along with the new trend in extrusion technology.

The course provides useful reference material to process engineers working in wire & cable extrusion, and practical hints and tools to help optimize the extrusion processes.

**CANCELED**

# TECHNICAL SYMPOSIUM

**MONDAY, NOVEMBER 7, 2011 – 8:00 AM - 11:30 AM**

**SESSION 1: EXECUTIVE TRACK**  
(MR217D)

Chairperson: Robert M. Canny  
Nexans Inc., Wallingford, CT, USA

**(8:00)**  
Introduction and Welcome

**1-1 (8:05)**  
“The BRIC’s Role in Leading the Recovery” - R. Daniels, CRU Group

**1-2 (8:30)**  
“Uncharted Territory: Global Fiber Demand to Pass 200M f-km Market Review and Outlook” - P. Fay, CRU Group/KMI

**1-3 (8:55)**  
“Interconnection Industry Convergence - Assemblers Perspective” - L. Fahning, WHMA

**BREAK (9:20 – 9:45)**

**1-4 (9:45)**  
“Perspectives on the Worldwide Optical Fiber Marketplace” - B. Boersen, Corning

**1-5 (10:10)**  
“Industry Economic Environment” - R. Fry, DuPont

**(10:40)**  
Executive Panel: C. Kinlin, Corning Cable Systems; E. Edwards, CommScope; T. Murray, OFS Fitel; N. Wilkin, OCC; and P. Edwards, Prysmian Cables & Systems

**SESSION 2: FIBER AND CABLE RELIABILITY**  
(MR217A)

Chairperson: Agusti Valls Prats  
Prysmian SpA, Milano, Italy

**2-1 (8:00)**  
“Improvement of the Precision (Repeatability and Reproducibility) of a Test Method to Characterize Microbending Performance of Optical Fibers” - L. Han, P. Shah, X. Wu and S. Schmid, DSM Functional Materials, Illinois, USA; and J. Zhao, DSM Functional Materials, Shanghai, China

**2-2 (8:25)**  
“Effect of Ageing Conditions on Performance Properties of Selected Commercial Fibers” - P. Shah, L. Han, E. Murphy and S. Schmid, DSM Functional Materials, Illinois, USA; and D. Peterson, Verizon, Texas, USA

**2-3 (8:50)**  
“Bend Insensitive Optical Fibers for Elevated Temperature Applications” - V.A. Kozlov, Corning Incorporated, New York, USA

**BREAK (9:15 – 9:45)**

**2-4 (9:45)**  
“Electrical and Thermal Analysis of OPGW Cables Submitted to Short-Circuit Conditions” - J. Pinho, L. Gonzalez and V. Dmitriev, Universidade Federal do Pará, Pará, Brazil; S. Colle, Universidade Federal de Santa Catarina, Santa Catarina, Brazil; M. Andrade, J.C.V. da Silva and M. Bedia, Prysmian Telecomunicações Cabos e Sistemas do Brasil, São Paulo, Brazil

**2-5 (10:10)**  
“New Studies on Accelerated Ageing of Fibre Coatings” - D. Cuomo, FOS-Prysmian, Battipaglia, Italy; and L. Terruzzi, Prysmian, Milano, Italy

**2-6 (10:35)**  
“Measurement and Characterization of Key Fiber Reliability Attributes” - J.J. Englebert and A.C. Millett, Corning Incorporated, New York, USA

**PLENARY LUNCHEON**  
(11:45 AM - 2:00 PM)

**SEE FOLLOWING PAGE FOR DETAILS**

**MONDAY, NOVEMBER 7, 2011 – 2:00 PM - 6:00 PM**

**EXHIBITS**  
(Exhibit Hall C2)  
Refreshments available

**MONDAY, NOVEMBER 7, 2011 – 2:30 PM - 5:30 PM**

**NEW PRODUCT INTRODUCTIONS**  
(Exhibit Hall C2)

Chairperson: Mike Patel  
Teknor Apex Company, Pawtucket, RI, USA

**TUESDAY, NOVEMBER 8, 2011 8:00AM – 12:00PM**

**SESSION 3: FIBER & CABLE DESIGN AND FTTH**  
(MR217A)

Chairperson: Takeshi Hidaka  
Furukawa Electric Co., Ltd., Tokyo, Japan

**3-1 (8:00)**  
“Development and Introduction of Indoor Optical Cable Using Single-Mode Hole-Assisted Fiber in Central Offices” - N. Ogawa, T. Ito, Y. Enomoto, S. Aozasa and H. Fujimoto, Nippon Telegraph and Telephone Corporation, Ibaraki, Japan

**3-2 (8:25)**  
“Development of Flame-Retardant Low-Friction Optical Indoor Cable” - M. Tsukamoto, F. Ishida, E. Konda, M. Aragaki and N. Okada, Furukawa Electric Company Limited, Chiba, Japan

**3-3 (8:50)**  
“Fire Resistant Optical Cable” - M. Maritano, D. Ceschiati and M. Maritano, Prysmian Spa, Milano, Italy; E. Consonni, Prysmian Cavi e Sistemi Italia Srl, Milano, Italy

**3-4 (9:15)**  
“Development of the Ultra High Density Loose Tube Cables Using 200µm Coated Fibers for Microduct Application” - T. Fukute, A. Namazue, M. Ogi, S. Shiobara and N. Okada, Fujikura Limited, Chiba-ken, Japan

Continued on page 9

# PLENARY SESSION LUNCHEON

## BALLROOM AB

(Limited Seating Available)

### ANNOUNCEMENTS/GREETINGS

Robert A. Wessels, Jr., Chairman, IWCS, Inc. Board of Directors, CommScope, Inc., Claremont, NC, USA  
David Kiddoo, Vice-Chairman, IWCS, Inc. Board of Directors & Chairman, IWCS Program Committee, AlphaGary Corporation,  
Leominster, MA, USA

### KEYNOTE SPEAKERS

“Broadband in the United States: What is Our Path Towards High Performance Knowledge Exchange?”

Dr. Blair Levin

Communications and Society Fellow  
The Aspin Institute, Washington, DC, USA

“The Smart Connectivity”

Philip Gilchrist

Chief Technology Officer and Vice President  
TE Connectivity, Greensboro, NC, USA

### AWARDS AND RECOGNITION

Presented By

Hélio J. Durigan, Chairman, IWCS Symposium Committee, Furukawa Industrial S.A. Produtos Elétricos, Curitiba, Brazil

#### Jack Spergel Memorial Award for Outstanding Technical Paper

Robert Elkins, Jeff Danley and Dr. Kevin Sparks

Corning Cable Systems, Hickory, NC, USA

Alexey Amosov and Petr Gorelchenko

Corning Scientific Center, St. Petersburg, Russia

Dr. Andrey Kobayakov

Corning Incorporated, Corning, NY, USA

“Compensating for Fiber Undercut in Physical Contact Optical Connectors”

#### Outstanding Poster Paper

Curtis Queen, Dave Chiasson and Mark Paap

Corning Cable Systems, Hickory, NC, USA

“Inkjet Printing for Outdoor Cable Designs”

#### Kitts-Kingsley Award for Best Presentation

Robert Elkins

Corning Cable Systems, Hickory, NC, USA

“Compensating for Fiber Undercut in Physical Contact Optical Connectors”

#### Recognition of IWCS Leaders of the Past

Robert A. Wessels, Jr., Chairman, IWCS, Inc. Board of Directors, CommScope, Inc., Claremont, NC, USA

Nils Artlöve | Dr. Peter R. Bark | M. Edward Fenton | Brian Garrett | Dr. Reiner J. Gerdes | Dr. Raymond Jaeger  
Robert D. Kenny | Irving Kolodny | Gregory J. Lampert | James R. Leech | Pete D. Lockhart | Hans A Mayer  
Thomas Neesen | Dieter S. Nordmann | James Pickering | Richard Rossi | Manuel R. Santana | John R. Sicotte  
Dr. C. Ronald Simpkins | Michel Rousseau

# TECHNICAL SYMPOSIUM

## BREAK (9:40-10:10)

### 3-5 (10:10)

"Microbend Evaluation of Selected G652D and G657 Fibers and Ribbons Before Cabling" - B. Arvidsson, Fiberson AB, Hudiksvall, Sweden; P. Shah and S. Schmid, DSM Functional Materials, Illinois, USA; R. Alexandersson and A. Björk, Ericsson AB, Hudiksvall, Sweden

### 3-6 (10:35)

"A Study of Induced Losses During Testing of Microduct Cables" - S. Hopland, Telenor AS, Fornebu, Norway

## SESSION 4: OPTICAL CONNECTIVITY AND CHINA TELECOM FTTH FORUM

(MR217D)

Chairperson: Guy Castonguay

Corning Greater China Telecom (GCT), Shanghai, China

### 4-1 (8:00)

"Development of Physical Contact Model for MT Optical Interconnects" - M. Gurreri and M. Kadar-Kallen, TE Connectivity Limited, Pennsylvania, USA; D. Childers, M. Hughes and S. Lutz, US Conec Limited, North Carolina, USA

### 4-2 (8:25)

"Assuring Environmental Stability in Remote Grip Optical Fiber Connectors" - R.P. Pepin, 3M Company, Texas, USA

### 4-3 (8:50)

"Development of New Connector for Coated Optical Fiber Using Coating Removal Technology" - M. Ida, T. Sasaki, A. Daido, K. Takamizawa and T. Numata, NTT Corporation, Ibaraki, Japan

### 4-4 (9:15)

"Minaturised Plug and Play Fibre Optic Cabling System for a Residential Satellite TV Network" - L. Cavenaghia and I. Griffiths, Prysmian SPA, Milan, Italy

## BREAK (9:40-10:10)

## PANEL

### 4-5 (10:10)

"Status and Evolution of Optical Networks in China" - L. Wei, China Telecommunications Corporation, Beijing, China

### 4-6 (10:50)

"China Telecom Shanghai FTTH Development" - F. Wu, Broadband Network, China Telecom Shanghai, Shanghai, China

### 4-7 (11:10)

"China Telecom Jiangsu FTTH Development" - Y. Zhao, Operation and Maintenance, China Telecom Jiangsu Corporation, Nanjing, China

(11:30) Question and Answers

## SESSION 5: CABLE COMPONENTS AND PROCESSES

(MR213D)

Chairperson: Steven Galan

Underwriters Laboratories Inc., Melville, NY, USA

### 5-1 (8:00)

"Analyses of Electrical Performance of Category 6 U/UTP Cable Along the Copper Annealing Curve on Different Twisting Machine" - D. Scheiner, M. Beninca, M. Simião, R. Maia de Andrade, C. Kuniyoshi, R. Cruz, S. Joly and H. Durigan, Furukawa Industrial S.A. Produtos Elétricos, Paraná, Brazil

### 5-2 (8:25)

"Cable Print Verification System" - C. Girdwood and B. Branklin, Taymer International Incorporated, Ontario, Canada

### 5-3 (8:50)

"Development of RoHS Compliance Colored PTFE Tape for Aerospace Electric Wire Insulation" - J. Zhang and C. Williams, Technetics Group, an EnPro Industries Company, Texas, USA

### 5-4 (9:15)

"Insights on Silane Crosslinking of PE and Tin-Free Future" - K. Weissenbach, Evonik Industries Corporation, New Jersey, USA; and A. Ioannidis, Evonik Industries AG, Rheinfelden, Germany

## BREAK (9:40-10:10)

### 5-5 (10:10)

"A New Class of Perfluoropolymers: High-Temperature Epitaxial Co-Crystalline (ECC) Perfluoropolymer Resins" - M. P. Samija, J. Lahijani, G.M. Puce and J.L. Netta, DuPont Chemicals and Fluoroproducts, Delaware, USA

## SESSION 6: COPPER CABLING TECHNOLOGY

(MR213A)

Chairperson: Robert A. Wessels, Jr.

CommScope, Inc., Claremont, NC, USA

### 6-1 (8:00)

"Noncompliant Cabling Products - How Big is the Problem and What Can be Done?" - T. Harpel, Berk-Tek a Nexans Company on behalf of the Communications Cable and Connectivity Association (CCCA), Pennsylvania, USA

### 6-2 (8:25)

"How to Use the Spectral Emulation Method in Designs of Multi-Pair Broadband Cables?" - Z. Araujo and E. Ferreira, Universidade Estadual de Campinas - UNICAMP, SP, Brazil; D. da Silva and V. Barbosa, Agência Nacional de Telecomunicações - ANATEL, DF, Brazil; and E. Souza, Telcon Fios e Cabos para Telecomunicações S.A., SP, Brazil

## PANEL 6-3 & 6-4 (8:50)

"Next Generation Copper Cabling; 40 Gb and Beyond" Presented by the Chairs of the TIA TR42.7 Next Generation Task Group: S. Vaden, Optical Cable Corporation, North Carolina, USA; F. Straka, Panduit Corporation, Illinois, USA; D. Hess, Nexans, Pennsylvania, USA; T. Hayes, CommScope, North Carolina, USA; and B. Celella, The Siemon Company, Connecticut, USA

# TECHNICAL SYMPOSIUM

## BREAK (9:40-10:10)

### 6-5 (10:10)

"Improvements in Balun Calibration for Structured Cabling" - A. Duffy and H. Sasse, De Montfort University, Leicester, United Kingdom; and J.H. Walling, Independent Consultant, Beaconsfield, Canada

### 6-6 (10:35)

"Measuring and Modeling of Insertion Loss in Cables with Helical Screens" - J. Poltz, OptEM Engineering Incorporated, AB, Canada; and M. Josefsson, Ericsson Network Technologies, Hudiksvall, Sweden

### 6-7 (11:00)

"Assessment of Bundle Heating Due to Power Transmission Over Ethernet Cabling" - F.S. Akinnuoye, A. Duffy, F. S. Akinnuoye and H. Sasse, De Montfort University, Leicester, United Kingdom; and J.H. Walling, Independent Consultant, Quebec, Canada

## TUESDAY, NOVEMBER 8, 2011 10:00AM – 6:00PM

### EXHIBITS

(Exhibit Hall C2)

Refreshments available

## TUESDAY, NOVEMBER 8, 2011 1:00PM – 4:00PM

### SESSION 7: MULTI-MODE FIBERS

(MR217A)

Chairperson: Peter Pilon

OFS, Sturbridge, MA, USA

### 7-1 (1:00)

"Design and Characterization of Bend-Insensitive Multimode Fiber" - S.R. Bickham, O. Kogan, M.J. Li, P. Tandon, J. Abbott and S. Garner, Corning Incorporated, New York, USA

### 7-2 (1:25)

"Comparison of Bend Insensitive and Standard Multimode Fiber" - D. Mazzaresse, G. Oulundsen III and X. Jiang, OFS, Massachusetts, USA; and Y. Sun, OFS, Georgia, USA

### 7-3 (1:50)

"The Straight Story on Bend-Insensitive Multimode Fibers" - A. Sengupta, E. Leichter and P. Kolesar, CommScope, Texas, USA

## BREAK (2:15-2:45)

### 7-4 (2:45)

"Connectivity and Compatibility Performance of Bend-Insensitive Multimode Fibers" - A. Amezcua, Prysmian Group, North Carolina, USA, L. Provost, F. Achten and G. Kuyt, Prysmian Group, Marcoussis, France; D. Molin, H. Maerten, L. Galkovsky and P. Sillard, Prysmian Group, Eindhoven, The Netherlands

### 7-5 (3:10)

"25Gbps Transmission Over Laser-Optimized Multimode Optical Fiber" - Y. Sun, R. Lingle Jr. and G. Oulundsen, OFS, Georgia, USA; C.P. Caputo and S. Ralph, Georgia Tech University, Georgia, USA

### SESSION 8: INSTALLATION

(MR217D)

Chairperson: Dr. C. Bertil Arvidsson

Fiberson AB, Hudiksvall, Sweden

### 8-1 (1:00)

"Handheld Angle Fiber Cleaver" -N. Otsu, S. Kobayashi, T. Nikuta and T. Hayashi, Tyco Electronics Japan G.K., Kanagawa, Japan

### 8-2 (1:25)

"Understanding of Cable in Duct Installation: Do's and Dont's" - W. Griffioen, Plumettaz SA, Bex, Switzerland

### 8-3 (1:50)

"Improved Water Sensor Module for Detecting Water in Cable Joints" - K. Nakazawa, Y. Enomoto, T. Watanabe and H. Fujimoto, NTT Corporation, Ibaraki, Japan

## BREAK (2:15-2:45)

### 8-4 (2:45)

"Development of Cable and Connectivity Solutions" - W.A. Yates and W.C. Hurley, Corning Cable Systems LLC, North Carolina, USA

### 8-5 (3:10)

"Minicables for Blowing Installation Technique Based on Micro-Module Solution" - M. Maritano, D. Ceschiati, S. Frigerio and A. Macchetta, Prysmian SpA, Milano, Italy; E. Consonni, Prysmian Cavi e Sistemi Italia Srl, Milano, Italy

### 8-6 (3:35)

"Blowing of Mini-Cables in Extreme Ambient Weather Conditions" - R. Sutehall, M. Davies and T. Joslin, Prysmian Cables & Systems Limited, Hants, United Kingdom; W. Griffioen and J. Heinonen, Plumettaz SA, Bex Switzerland

### SESSION 9: FLAME RETARDANT MATERIALS

(MR213D)

Chairperson: David Braun

Cable Components Group LLC, Pawcatuk, CT, USA

### 9-1 (1:00)

"Foam Fluoropolymer Solutions for Processing for Insulating High Performance Cables" - R.T. Young and G.G. Thuot, DuPont Chemicals and Fluoroproducts, Delaware, USA

### 9-2 (1:25)

"New Developments in Fluor-Polymer Processing for Data-, Coaxial-, Micro-Coaxial and Specialty Cables" - G. Hofer, Rosendahl Maschinen GmbH, Pischelsdorf, Austria

### 9-3 (1:50)

"Impact of Environmental and Radiation Exposure on Flammability of Fiber Optic Cable Materials for Nuclear Power Applications" - B.G. Risch, R. Lovie and E. Bowman, Prysmian Group, North Carolina, USA

## BREAK (2:15-2:45)

# TECHNICAL SYMPOSIUM

## 9-4 (2:45)

“Molybdate/Borate Complexes for Enhanced Cable Compound Fire Performance” - A. Isarov, D. Temples and T. Chen, J.M. Huber Corporation, Georgia, USA; and J.K. Walker, The Sherwin-Williams Company, Ohio, USA

## 9-5 (3:10)

“Thermoplastic Polyurethane Solutions for Low Smoke Zero Halogen (LSZH) Flame Retardant Cable Applications” - O. Muehren and O. Henze, BASF Polyurethanes GmbH, Lemförde, Germany

## 9-6 (3:35)

“New Non-Halogenated Flame Retardant TPU with Excellent Mechanical Properties and High LOI” - C. Makadia, J. Horrión and C. Boyher, Lubrizol Advanced Materials, Incorporated, Ohio, USA

## SESSION 10: CONNECTIVITY SOLUTIONS

(MR213A)

Chairperson: Garry E. Heverly

Emerson Network Power Connectivity Solutions, Lafayette Hill, PA, USA

## 10-1 (1:00)

“Simple Inspection Tool for Cleaved Optical Fiber Ends and Optical Fiber Connector End Surfaces” - M. Okada, M. Kihara, M. Hosoda and M. Toyonaga, NTT East Corporation, Tokyo, Japan

## 10-2 (1:50)

“Evolving Communication Systems will Benefit from New Types of Fiber Optic Cables and Connectors” - J. Shea, HARTING North America, Incorporated, Illinois, USA

**TUESDAY, NOVEMBER 8, 2011, 4:00PM – 6:00PM**

## POSTER PAPER SESSION

(Back Exhibit Hall C2)

Chairpersons: Eric Whitham

OFS, Carrollton, GA, USA

Dr. Alistair Duffy

De Montfort University, Leicester, United Kingdom

**P-1** “High Fiber Packing Density Multimode Interconnect Cordage” - P. Weimann, W. Allen and D. Mazzaresse, OFS Fitel, LLC, Georgia, USA

**P-2** “A Study on Reliability for Large Diameter Multi-Core Fibers” - R. Sugizaki, K. Imamura, I. Shimotakahara and K. Mukasa, Furukawa Electric Company Limited, Ichihara Chiba, Japan; and N. Oyama, Furukawa Electric Company, Limited, Kameyama Mie, Japan

**P-3** “Eco Design Applied to Optical Cable” - A. Brossault, S. Jammes, J. Lemonnier, J.C. Da Rocha and C. LaGreve, ACOME, Mortain, France

**P-4** “A Sensitivity Improved Vibration Sensing Optical Cable” - X. Chen and J. Huang, Tongguang Group Company Limited, Shanghai, China; Z. Ji and J. Xu, Jiangsu Tongguang Communication Company Limited, Haimen, China; and R. Gan and S. Ren, Ningbo Nuoke Electronic Technology Development Company Limited, Ningbo, China

**P-5** “Small Size Ultra Low Attenuation 48-Fiber OPGW for Long Repeater-Span Application” - J. Huang and X. Chen, Tongguang Group Company Limited, Shanghai, China; and F. Zhou, Jiangsu Tongguang Optical Cable Company Limited, Haimen, China; and T. Jinming, Jiangsu Tongguang Communication Company Limited, Haimen, China

**P-6** “A Project Application of Air-Blowing Micro-Cable Technology and Its Development in China” - Q. Qi, H. Shi, K. Fu, F. Qian and S. Wang, FiberHome Telecommunication Technologies Company Limited, Hubei, P.R. China

**P-7** “The Development of Optical Fiber Composite Low-Voltage Cable (OPLC)” - H. Chen, X. Xiong, S. Wang and C. Liu, FiberHome Telecommunication Technologies Company Limited, Hubei, P.R. China

**P-8** “Later Fiber Installing Optical Power Hybrid Cable” - X. Chen and J. Huang, Tongguang Group Company Limited, Shanghai, China; and Z. Zhang, Jiangsu Tongguang Electronic Wires and Cables Corporation Limited, Haimen, China

**P-9** “Study of the Power Fiber to the Home Technologies Based on the OPLC Cable” - R.S. Yang, S.H. Xie, J.M. Zhang and X.J. Li, Zhongtian Technology Group Company Limited, Jiangsu Province, P.R. China

**P-10** “Electron-Beam Radiation Crosslinkable and Compatibilized PA11/PA12/LDPE Blends with Good Barrier Properties and Improved Heat Resistance for the Cable Sheathing Application” - D. Kang, Chengdu Putian Telecommunications Cable Company Limited, Sichuan, China

**P-11** “Comparison of Standard UV Test Methods for the Ageing of Cables” - J. Robinson, Borealis Polymers NV, Belgium; A. Linder, Borealis AB, Sweden; A. Gemmel, Nexans, Germany; K. Venø-Poulsen, NKT, Denmark; H. Burkhard, Prysmian, Germany; P.A. Högström, Ericsson, Sweden; and M. Kobilsek, Draka, The Netherlands

**P-12** “Highly Efficient Cooling Unit of Glass Fiber for High Speed Optical Fiber Drawing” - W.S. Lee, S.H. Song, D.S. Moon and Y.S. Lee, Samsung Electronics Fiber Optics Company Limited, Gumi, Korea; and K. Kim, Kumoh National Institute of Technology, Gumi, Korea

**P-13** “Development of Category 6/6A 110 Connecting Block” - S.J. Kim, Y.I. Joe, D.E. Lee, K.S. Nam, W.B. Kim and J.S. Baek, LS Cable & Systems, Anyang, Korea

**P-14** “Fabrication and Gain Characteristics of the Erbium-doped Photonic Crystal Fiber” - W. Chen, S. Li, W. Luo, D. Wang and Q. Mo, Fiberhome Telecommunication Technologies Company Limited, Wuhan, P.R. China

**P-15** “Installation of Fiber Optic Cable Outside the Box” - C.M. Quinn and D.A. Seddon, Corning Cable Systems, North Carolina, USA

**P-16** “The Test and Analysis on Aging of Chinese Earliest Optical Trunk Cables” - C. Liu, L. Chen and S. Wang, Fiberhome Telecommunication Technologies Company Limited, Hubei, P.R. China

**P-17** “Enhanced Properties of Thermoplastic Halogen Free Flame Retardant Compounds via On-Line Low Energy Electron Beam Irradiation” - K. Bolz, A. Neubauer and S. Wasserman, The Dow Chemical Company, Pennsylvania, USA

# TECHNICAL SYMPOSIUM

**WEDNESDAY, NOVEMBER 9, 2011, 8:00AM – 11:30AM**

## **SESSION 11: FTTH CABLE TECHNOLOGIES & SOLUTIONS**

(MR217A)

Chairperson: Jeff S. Barker

Prysmian Group, Draka Communications Americas, Claremont, NC, USA

### **11-1 (8:00)**

“Embedded Extractable Optical Cabling Solution for Brownfield MDU Building Networks” - F. Abbiati and I. Griffiths, Prysmian Spa, Milano, Italy

### **11-2 (8:25)**

“Non-Traditional Utilization of Tight Buffered Optical Fiber in Multi-Dwelling Unit Applications” - D.K. Larson and L.M. Wilkes, 3M Communications Markets Division, Texas, USA; D.J. Yamasaki, Prysmian Group, North Carolina, USA

### **11-3 (8:50)**

“New Riser for FTTH Applications Cable Including Tight Reinforced Bend Resistant Fibers” - M. Garcia, D. Galan and B. Manteca, Prysmian Group, Maliano, Spain; and J.M. Testu, Prysmian Group, Calais, France

**BREAK (9:15-9:45)**

### **11-4 (9:45)**

“A Further Step in Diameter Reduction of High Fiber Count Duct Cables for FTTH Applications Taking Full Benefit of Reduced Size Bend Resistant Optical Fibers” - O. Tatat, J.M. Testu and A. Lavenne, Prysmian Group, Calais, France; N. Tranvouez, Prysmian Group, Argenteuil, France; B. Overton, Prysmian Group, North Carolina, USA; and L. Provost, Prysmian Group, Marcoussis, France

### **11-5 (10:10)**

“Single Window Opening Method for Straight Mid-span Permanent Access Cables” - P. Lesueur, J. Lemonnier, P. Lallinec, P. Breux, O. Hervé, D. Fillatre and P. Chevalier, ACOME, Mortain, France

### **11-6 (10:35)**

“FTTx Optical Fiber Cable for Easy Mid-Span Access” - K. Yamamoto, H. Satou, T. Hirama, Y. Hashimoto, S. Egawa, H. Miyano, T. Saitoh, K. Fujita, R. Oka and A. Ona, Sumitomo Electric Industries, Limited, Yokohama, Japan

### **11-7 (11:05)**

“Technology for Reconnecting Optical Fiber Cable in Existing Drop Closures” - C. Suzuki, Y. Takahashi, A. Hamaoka, T. Numata and K. Takamizawa, NTT Corporation, Ibaraki, Japan

## **SESSION 12: ADVANCES IN OPTICAL FIBER DESIGN AND APPLICATION**

(MR217D)

Chairperson: Ad Abel, DSM Desotech, Hoek Van Holland, The Netherlands

### **12-1 (8:00)**

“Dispersion Compensated Multimode Fiber” - B. Lane, R. Pimpinella, J.M. Castro, and B. Kose, Panduit Corporation, Illinois, USA

### **12-2 (8:25)**

“Chromatic Dispersion Compensated Multimode Fibers for Data Communications” - D. Molin, M. Bigot-Astruc and P. Sillard, Prysmian Group, Marcoussis, France

### **12-3 (8:50)**

“Heat-Resistant Optical Fiber Coated with Newly Developed UV Curable Silicone Resins for Sensing” - K. Sohma and T. Hattori, Sumitomo Electric Industries, Limited, Yokohama, Japan

**BREAK (9:15-9:45)**

### **12-4 (9:45)**

“Low Signal Latency in Optical Fiber Networks” - J.A. Jay, Corning Optical Fiber, New York, USA

### **12-5 (10:10)**

“Cabling Next Generation Pure Silica Core Fibers” - P.S. VanVickle and L.M. Alexander, Sumitomo Electric Lightwave, North Carolina, USA; M. Hirano and S. Ohnuki, Sumitomo Electric Industries, Yokohama, Japan

## **SESSION 13: SPECIAL APPLICATIONS FOR METALLIC CABLES**

(MR213D)

Chairperson: Trent Hayes

CommScope, Inc., Claremont, NC, USA

### **13-1 (8:00)**

“Development of Aluminum Wire for Automotive Harnesses” - K. Susai and S. Sekiya, Furukawa Electric Company Limited, Tokyo, Japan; and S. Takamura, Furukawa Automotive Systems Incorporated, Tokyo, Japan

### **13-2 (8:25)**

“EV Charging System to the Rail Power Grid” - S. You, T. Lee, Y. Cho and L. Park, LS Cable and System, Gyeonggi-Do, Korea

### **13-3 (8:50)**

“Development of Lightweight Halogen-free Electric Wire for Railway Rolling Stock” - H. Chiba, M. Nishiguchi and T. Kumasaka, Furukawa Electric Company Limited, Chiba, Japan

**WEDNESDAY, NOVEMBER 9, 2011, 9:00AM – 12:00PM**






## **EXHIBITS**

(Exhibit Hall C2)




Refreshments available

# MEET OUR SPONSORS




## PARTNER LEVEL

	<p>Developer and manufacturer of compounds including specialty vinyl alloy SMOKEGUARD®, halogen-free MEGOLON®, and thermoplastic elastomer (vinyl, olefinic, styrenic) GARAFLEX®. Manufacturing sites in the UK, US, and Canada.</p>
	<p>Cable Components Group has over 10 years of expertise manufacturing high performance cable fillers, extrusions, fibers and yarns for the wire and cable fiber optic industries as well as other industrial nonwoven and textile markets.</p>
	<p>CommScope is a global leader in connectivity solutions for communications networks. We provide infrastructure solutions for wireless, business enterprise, residential broadband and carrier wire line networks. Founded in Hickory, North Carolina more than 30 years ago, CommScope and its worldwide team of more than 13,000 employees create infrastructure solutions for communications networks in more than 130 countries.</p>
	<p>Corning's ground-breaking telecommunications innovations provide customers with high-quality solutions that bring broadband capabilities right to their doorstep. The company's fiber, cable, hardware and equipment products are the keystone components that have driven the global optical communications revolution for more than 35 years.</p>
	<p>Dow Wire and Cable Compounds produces polyolefin-based compounds that are used as insulation and jacketing materials, providing a unique combination of mechanical strength, flexibility, electrical properties, aging stability, and process ability.</p>
	<p>NEPTCO makes a wide range of flexible and rigid strength elements with and without water blocking properties for fiber optic cables and multi-ply shielding tapes; heat-seal and pressure-sensitive coated films and laminates; foil free edged tapes; screening tapes; separator tapes; barrier/binder tapes; slit films; printed marker identification; water blocking tapes and yarns; and nonwoven semi-conductive power cable tapes.</p>
	<p>With its two businesses, Energy Cables &amp; Systems and Telecom Cables &amp; Systems, Prysmian boasts a global presence with subsidiaries in 38 countries, 53 plants in 21 countries, 7 Research &amp; Development Centers in Europe, USA and South America, and some 12,000 employees.</p>


## PLATINUM LEVEL

	<p>DuPont is the premier supplier of high performance fluoropolymer resins and films. Our Teflon® and Tefzel® products have been helping the wire and cable industry meet their most demanding applications for over 75 years.</p>
	<p>Para-aramid yards, standard and water-blocking finishes.</p>
	<p>Official Magazine of the IWCS Conference™.</p>

## GOLD LEVEL

	<p>Furukawa Electric Group broadly provides optical fiber cables, optical communications equipment and systems to every corner of the world to support next-generation, high-capacity communication networks essential to multimedia society.</p>
	<p>LS Cable leads the industry with customized solutions and services that meet the demanding needs of our clients worldwide. We have developed the following solutions with the scalability to serve both the private and public sector: FTTH (Fiber to The Home) System, SI (System Integration), Optical fiber &amp; cable, UTP Cable, RF Solution.</p>
	<p>Teknor Apex Company, a supplier of thermoplastic compounds to the wire and cable industry offers a full range of RoHS-complaint, UL-Recognized extrusion and molding compounds.</p>

## DONOR LEVEL

	<p>Underwriters Laboratories has the expertise, testing capability, brand recognition and global presence needed to provide a full portfolio of wire and cable testing services for Fire Safety, Performance Verification, Component Cabling and Compound Performance to the industry.</p>
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# CONFERENCE INFORMATION

## ADVANCE REGISTRATION

Please visit [www.iwcs.org](http://www.iwcs.org) for advance registration by credit card.

## ON-SITE REGISTRATION SCHEDULE\*

Registration will be held at:

The Charlotte Convention Center, Concourse C, during the following hours:

Sunday, Nov 6, 2011	1:00 PM to 6:00 PM
Monday, Nov 7, 2011	6:00 AM to 6:00 PM
Tuesday, Nov 8, 2011	7:00 AM to 6:00 PM
Wednesday, Nov 9, 2011	7:00 AM to 10:00 AM

\*All conference attendees must register and obtain a badge.

\*Badges must be worn for access to all IWCS events.

## DRESS CODE: BUSINESS CASUAL

## CONFERENCE REGISTRATION FEES

REGISTRATION	ADVANCED	ON-SITE
<b>Technical Symposium - Monday thru Wednesday</b> (Includes Technical Sessions, Exhibits and Plenary Session)		
General Admission	\$750	\$1050
Speaker (one per paper)	\$600	\$700
Academic (Faculty with ID)	\$175	\$175
Spouse (of Registered Attendee)	\$200	\$225
Student Fee (with ID)	\$ 25	\$ 25

### Technical Symposium – One Day Only

(Includes Technical Sessions, Exhibits & Plenary Session)

General Admission	\$425	\$475
Speaker (one per paper)	\$325	\$375

Special this year for companies who want to send 5 or 10 people for one day's Technical Symposium. Must register in advance. Point of contact must fill out a registration form with payment and email to [phudak@iwcs.org](mailto:phudak@iwcs.org). You will then be given 5 or 10 special registration cards to give out to your employees. They are to fill out the card and hand them in onsite at the registration desk where they will then be given a registration badge and a CD.

Advanced 1-day; 5-pack -- \$1500

Advanced 1-day; 10-pack -- \$2500

## ADDITIONAL EVENT FEES

Professional Development Courses*	ADVANCED	ON-SITE
1 Course	\$545	\$675
2 Courses	\$820	\$950
1 Course w/Symposium registration	\$350	\$475
2 Courses w/Symposium registration	\$500	\$625

\*All courses include a copy of the Instructor's Notes. Minimum of 10 attendees per course and IWCS reserves the right to limit enrollment or cancel course.

### Exhibit Hall Fees

(Focus Suppliers' Exhibition – Mon - Wed)	ADVANCED	ON-SITE
One Day	\$ 50	\$ 75
Two Days	\$ 95	\$125

Wednesday Only Free – Must register onsite.

### NOTE:

1. CANCELLATION: Conference or course cancellations must be received in writing by 10/7/11 and are subject to a \$25 processing fee. After this date, no refunds are granted. Substitutions are allowed.
2. VISA, MC & AMEX accepted at conference.
3. Pictures (camera/cell phone), Videotaping or electronic recording during this conference is not permitted.

## COCKTAIL RECEPTION – NASCAR FACILITY

Monday, Nov 7, 2011 – 6:30 to 8:00 PM

All attendees are cordially invited to the IWCS 60th Birthday reception on Monday evening. The exciting NASCAR Hall of Fame, adjacent to the Charlotte Convention Center, is the venue. Cocktails and light snacks, plus racing cars, racing simulators and the exciting atmosphere of this American tradition are offered. Your IWCS Conference badge is required for admission, with entry through the Convention Center connector near the IWCS Symposium meeting rooms. Badges must be picked up by 5:45pm on Monday.

## EXHIBIT HALL SCHEDULE

(Exhibit Hall C2) - All Registered Attendees

Monday, Nov 7, 2011	2:00 PM to 6:00 PM
Tuesday, Nov 8, 2011	10:00 AM to 6:00 PM
Wednesday, Nov 9, 2011	9:00 AM to 12:00 PM

## LUNCH

Monday, Nov 7, 2011

Plenary Session (Ballrooms A/B) – Registered Technical Symposium attendees only (seats are limited).

## TRANSPORTATION

NOTE: The following information is provided for your convenience. IWCS takes no responsibility for any transportation option to and from the IWCS Conference.

### Airport Transportation

Attendees arriving at Charlotte Douglas International Airport have the option of car rental, taxi or other transportation services available at the airport. The airport is about 25 minutes away from the Convention Center and Westin Hotel, with taxi service costing approximately \$30. For our foreign visitors, please keep in mind that it is customary to tip taxi or hired sedan drivers.

## SPEAKER'S / INSTRUCTOR'S ORIENTATION BREAKFAST/LUNCH

On the day of your presentation, you are requested to attend a Speaker's Orientation Breakfast/Lunch as follows:

Instructors: Sunday (1 to 2 pm) – MR217B/C

Speakers: Monday through Wednesday (7:00 to 8:00 am) – MR217B/C  
During breakfast, you will have the opportunity to review the procedures for your oral presentation. In addition, a group photo of the session presenters with the chairperson will be taken. Afterwards, you will be directed to the room where you can review your PowerPoint® presentation.

## PRICING FOR PROCEEDINGS AND CDS

Registrants to the Technical Symposium will be offered their choice of printed and bound proceedings or a CD. Should a registrant wish to have both, a \$50 charge will apply. For those not registering for the Technical Symposium a charge of \$350 will apply for either the CD or the printed and bound proceedings. For copies of the proceedings from past years, please contact IWCS for availability and pricing information.

## FOR MORE INFORMATION, CONTACT

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Website: [www.iwcs.org](http://www.iwcs.org)

\*\*\*\*\* 61st International Cable Connectivity Symposium\*\*\*\*\*

November 11-14, 2012

Rhode Island Convention Center

Providence, RI, USA

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