

January 13, 2017

Dear OSA, Columbia Section, Members and Friends:

On Friday, **February 10, 2017**, Eric Udd of Columbia Gorge Research, LLC, will deliver a presentation titled "Mars or Bust! 40 years of Fiber Optic Sensor Development for Aerospace Applications." The following pages include a registration form for the event and an abstract of the presentation.

A catered high-quality dinner, beer, and wine will be served (see the registration form for a menu). If you want dinner at the meeting, dinner reservations must be made by **Monday, February 6, 2017**. There is a reduced price for students.

Email your registration form to and make advance payment arrangements with Rob Teel (rob.teel@stoel.com) on or before the **February 6, 2017** deadline. Rob will explain options for making electronic payment, but you may also mail to Rob a check payable to the OSA, Columbia Section Inc., which is now a 501(c)(3) public charity. As such, under IRC § 170, donors may deduct from their taxes contributions made to the OSA, Columbia Section, Inc.

We look forward to seeing you at the meeting.

Sincerely,
Robert R. Teel, Secretary-Treasurer
OSA, Columbia Section

Meeting Location at Stoel Rives LLP & Event Details

The meeting will be held in Stoel Rives' 30th floor conference room at the Park Avenue West (PAW) building, 760 SW Ninth Avenue, Portland, Oregon, 97205. The PAW building is located between SW Park and SW Ninth Avenues and between SW Yamhill and SW Morrison Streets.

There is a SmartPark garage at 730 SW 10th Avenue. The rear side of the SmartPark garage faces the PAW building entrance. There is also a parking garage under the PAW building. There is metered street parking available (parking fee required until 7:00 p.m.).

Once you arrive at the PAW building, take a south-side elevator to floor 30 and proceed to the meeting room.

Social Hour: 5:30–6:30 p.m.

Dinner: 6:30–7:15 p.m.

Introduction: 7:15–7:30 p.m.

******Please Circulate and/or Post******

Presentations: 7:30–9:00 p.m.

For further information, contact: Eric Udd (ericudd@aol.com) or Rob Teel (rob.teel@stoel.com).

******Please Circulate and/or Post******

Friday, February 10, 2017 Meeting

Name: _____

Company: _____

Address: _____

City, State, Zip: _____

Phone: _____ Fax: _____

Email: _____

Meeting registration:

___ Optional Dinner @ \$18.00 _____

___ Optional Full-Time Student Dinner @ \$12.00 _____

___ I am not able to attend but would like to add
my name to your mailing list. _____

Total: _____

Deadline for receipt of registration form and payment: February 6, 2017

Email to: rob.teel@stoel.com

Checks payable to: OSA, Columbia Section, Inc.

Dinner menu: Meat and Veggie Lasagna

Garlic Bread

Garden Salad

Cookies or Dessert Bars

Please copy and send to those who may be interested in attending the meeting.

******Please Circulate and/or Post******

February 10, 2017 Meeting

OSA, Columbia Section

Mars or Bust! 40 years of Fiber Optic Sensor Development for Aerospace Applications

Eric Udd, Columbia Gorge Research, LLC

Summary

In 1976, Vali and Shorthill at the University of Utah demonstrated the first fiber optic gyro. This led to interest at McDonnell Douglas Astronautics Company in possible application of this technology to support Delta Rocket navigation. The key invention of the closed loop fiber gyro in 1977 by Udd and Cahill led to ten years of intensive development and worldwide licenses. Closed loop fiber gyros are now on all the Mars rovers. Derivative inventions included the Sagnac acoustic, strain and distributed sensors. In 1985 McDonnell Douglas embedded fiber sensors in composite materials and demonstrated the utility of a Sagnac interferometer based strain sensor. A few years later fiber gratings were being used for aircraft and spacecraft structure demonstrations culminating in the flight demonstration of fiber gratings strain and temperature sensors on the conformal hydrogen tank of the Delta Clipper launch vehicle in 1993-94. From 1993 to the present, Blue Road Research and Columbia Gorge Research applications of fiber grating sensors continued with development of improved multi-dimensional strain, pressure, acoustic, and moisture sensors for aerospace, civil structures, composite manufacturing, electric power, medical and hazardous waste monitoring. All of these technologies will be useful for Mars colonization. This presentation provides a personal overview of this 40 year period and a look into the future.

Eric Udd is the President of Columbia Gorge Research, LLC. He has been working on fiber optic technology full time since 1977 with most of his work focused on interferometric fiber optic sensors, fiber gratings and secure fiber optic communication systems. Mr. Udd's efforts on fiber grating sensors began in the late 1980s and are ongoing. He has more than 200 papers and presentations, 54 issued US patents, and chaired over 30 international conferences on fiber sensors. Mr. Udd's book efforts include: Fiber Optic Sensors: An Introduction for Engineers and Scientists, Wiley, 2011, Fiber Optic Smart Structures, Wiley, 1995 and Field Guide to Fiber Optic Sensors, SPIE Press, 2014 and contributions of chapters to several other books. He is a Fellow of McDonnell Douglas, SPIE and OSA. Mr. Udd was awarded the OSA David Richardson Medal in 2009 for his work on fiber optic sensors and the field of fiber optic smart structures.

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