WG4 SENSECO

November 18 -21 , 2019
CETAL – INFLPR, Măgurele, România

# *WG4&WG1 - Training School*

# *"Traceability Chains, Uncertainty Propagation and Calibration/Validation"*

***Location: Center for Advanced Laser Technologies – INFLPR, Magurele, Romania***

***Dates: November 18-21th, 2019***

This workshop aims to provide a guidance on 1) laboratory based radiometric calibration and the corresponding uncertainty propagation equation, applied to field spectrometers, and 2) uncertainty/variability propagation of field measurements to top of the canopy radiances using radiative transfer models. The training school will bring together both experts and young scientists working with field spectrometers.

**Registration:**
Application with abstract and CV to participate in the workshop must be emailed to the workshop organisers – Laura MIHAI (laura.mihai@inflpr.ro), Andreas HUENI (ahueni@geo.uzh.ch), Javier PACHECO-LABRADOR (jpacheco@bgc-jena.mpg.de) before **1 September 2019**. The workshop is limited to 8 participants and is not open for the public at large.
The accomodation and travel expenses will be covered by COST Action ES1309 in the limit of 800 euro maximum/ participant, respecting the COST rules for travel support.
**Eligibility criteria:** Young PhD-students and researchers who have a proven background in field spectroscopy and/or vegetation monitoring using spectrometers. Programming skills (Python, Matlab or R) are recommended.
**Trainers:**
Andreas HUENI, researcher at the Remote Sensing Laboratories, Dept. of Geography, University of Zurich, Switzerland / Leader of SENSECO - WG4
Laura MIHAI, researcher at the National Institute for Laser, Plasma and Radiation Physics, Romania / Vice-leader of SENSECO -WG4
Javier PACHECO- LABRADOR, researcher at Max-Planck-Institute, Jena, Germany / vice-leader of SENSECO - WG1
Simon TRIM, University of Zurich, Switzerland

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**Important dates:**
Application deadline: **1 September 2019**
Notification of application: **15 September 2019**

## PROGRAM

The workshop is organized in two days of radiometric calibration and determining the measurement equation using different methods hands-on sessions and two days of propagation of measurement uncertainties and parameters variability from leaf to top of the canopy scale, as following:

**Day 1 (November, 18): $09^{00}$ - $18^{00}$**
Welcome to CETAL and introduction to SENSECO and its objectives related to this training school
*Theoretical approach*
- Key concepts for uncertainty analysis

*Coffee break*
- Introduction to propagation law of uncertainties

*Lunch*
- General steps for uncertainty budget
- „Steps 1-5 from uncertainty budget"

*Coffee break*
- „Steps 5-8 from uncertainty budget"

**Day 2 (November, 19):**
*Case of study: spectrometer system for field measurements*
- Hands-on for system laboratory radiometric calibration – radiance calibration

*Coffee break*
- Hands-on for system laboratory radiometric calibration – irradiance calibration

*Lunch*
- Describing the traceability chain for the case of study

Writing down the calculation equations *Coffee break*
- Considering the sources of uncertainty

**Day 3(November, 19): $09^{00}$ - $18^{00}$**

- Steps 4-6 – Determining the formal relationships for the case of study

*Coffee break*

- Steps 7-8 – Uncertainties propagation for the case of study

*Lunch*

- Introduction to RTM and LUT generation

*Coffee break*

- Uncertainty propagation in RTMs

**Day 4 (November, 20): $09^{00}$ - $14^{00}$**

- Instrumental uncertainty propagation from leaves to canopy with RTMs

*Coffee break*

- Parameters uncertainty propagation from leaves to canopy with RTMs
- 12-12:30: Conclusions and final remarks

*Lunch*