**Session Proposal**

# Session Title

Soil Spectroscopy: A Global Solution for Sustainable Soil Management and Food Security

# Session Organizers

Asim Biswas, Chair of Proximal Soil Sensing Working Group of IUSS, University of Guelph, biswas@uoguelph.ca (primary contact person)

Yi Peng, Global Soil Partnership, Food and Agriculture Organization of the United Nations (FAO), yi.peng@fao.org (primary contact person)

# Session Description

This symposium will address how soil spectroscopy is transforming our understanding and management of soils in the context of global challenges outlined in "Soil and the Shared Future for Humankind." As our planet faces unprecedented soil degradation—with soil being eroded every five seconds and projections suggesting 90% of Earth's soils could be degraded by 2050—spectroscopic techniques offer rapid, cost-effective, and non-destructive methods for comprehensive soil health assessment.

The session will showcase how global initiatives like the Global Soil Spectral Library are democratizing soil data access and standardizing methodologies across regions. Cutting-edge research in visible-near-infrared (vis-NIR), mid-infrared (MIR), and other spectroscopic techniques will be presented, demonstrating their applications in mapping soil carbon sequestration potential, monitoring degradation, guiding precision agriculture, and supporting evidence-based policy decisions.

Particular emphasis will be placed on how spectroscopy bridges the gap between laboratory analysis and field implementation, empowering farmers, land managers, and policymakers with actionable soil health data. The session will explore how these technologies can help meet Sustainable Development Goals by enhancing food security, mitigating climate change, and restoring degraded lands—especially in regions with limited soil testing infrastructure.

By bringing together experts from research institutions, international organizations, and the field, this symposium will foster cross-disciplinary collaboration and knowledge exchange that advances our collective ability to build resilient soil systems for a sustainable future for humankind.

# Format

The session will feature a combination of:

* Keynote presentations (~25 minutes each)
* Oral presentations (~15 minutes each)
* Interactive panel discussion (~45 minutes)
* Poster presentations

# Proposed Speakers

Dr. Eyal Ben-Dor, Tel Aviv University: World-renowned expert in hyperspectral remote sensing of soils and developer of innovative soil spectral analysis methods.

Dr. Titia Mulder, Wageningen University, contribution: Expert in soil carbon monitoring and verification systems using spectroscopy for climate mitigation.

Dr. Zhou Shi, Zhejiang University, a leading expert in the field of proximal soil sensing, soil spectroscopy, and digital soil mapping.

Dr. Raphael Viscarra Rossel, Commonwealth Scientific and Industrial Research Organisation (CSIRO): Leading expert in soil sensing, spectroscopy and digital soil mapping with extensive work on Australian and global soil spectral libraries.

Dr. José Alexandre M. Demattê, University of São Paulo: Expert in tropical soil spectroscopy applications and development of soil management systems in Brazil.

Dr. Johanna Wetterlind, Swedish University of Agricultural Sciences; Expert in soil spectroscopy applications in nutrient management.

Dr. Abdul Mouazen, Ghent University; Expert in soil spectroscopy, engineering of sensors, application development.

Dr. Yi Peng, Global Soil Partnership, FAO; Presenting the Global Soil Spectral Library initiative and international efforts to standardize spectroscopic approaches.