**Session Proposal**

# **Session Title**

Soil microbial diversity and functions in carbon and nitrogen cycling in response to tree diversity, wildfires and climate change

# **Session Description**

Soil microbes and their diversity play critical roles in biogeochemical cycles of carbon (C) and nitrogen (N) within global forest ecosystems, underpinning the important global biodiversity and ecosystem services. There is increasing evidence of accelerating biodiversity losses (particularly above ground biodiversity) and increasing frequency and intensity of climate extremes and wildfires as climate change intensifies. However, soil microbial diversity and functions in C and N cycling in global forests remain poorly understood, particularly in the context of biodiversity conservation (e.g. tree diversity restoration), increasing wildfires and climate extremes (such as floods, droughts, heatwaves and cold snaps). This Session will provide exciting opportunities to showcase the latest breakthroughs in conceptual frameworks and advanced technologies to fingerprint and quantify the dynamic and interactive C and N cycles mediated by the largely unknown or so called “dark soil microbes” in response to different biodiversity conservation measures (such as tree diversity restoration; and new functional platforms of biochar-based technologies coupled with introduction of novel and functionally important microbes as well as soil microbial diversity), prescribed burning and wildfires, and climate extremes (particularly flash floods, long droughts and heatwaves). The pressing technological challenges and important knowledge gaps in soil microbial diversity and functions in C and N cycling will also be identified in the context of intensifying climate change and increasing global biodiversity losses.

# **Session Organizers**

Conveners of IUSS Forest Soils Working Group: Session Chair - Professor Zhihong Xu, School of Environment and Science, Griffith University, Brisbane, Queensland 4111, Australia (email: zhihong.xu@griffith.edu.au); and Session Co-Chair – Professor Chirs Johnson, Department of Civil & Environmental Engineering, Syracuse University, Syracuse, New York, USA (email: cejohns@syr.edu).

# **Target Audience**

This Session is expected to attract soil chemists, soil physicists, soil biologists, forest ecologists, plant nutritionists, tree physiologists, climate change scientists and landscape ecologists as well as postgraduate students and postdoctoral researchers in soil and forest sciences, ecology and climate change science.

# **Format**

This Session would consist of oral presentations (selected and limited number of oral presentations, including 1-2 invited keynote presentations), 10-20 mins panel discussions at the end of oral presentations, and poster presentations for most of the Session participants.

# **Proposed Speakers**

Two invited keynote speakers are expected, including Professor Zhiqun Huang, a leading forest soil and global change scientist in the C and N cycles within forest ecosystems, in the context of biodiversity conservation and climate change, from Fujian Normal University, Fuzhou, China. The other keynote speaker might come from USA, Australia and Europe, but will be firmed up once the proposed Oral Session would be confirmed.

# **Relevance**

This proposed Session with both oral and poster presentations in “***Soil microbial diversity and functions in carbon and nitrogen cycling in response to tree diversity, wildfires and climate change***” is directly relevant to the central theme of IUSS’s 23rd World Congress of Soil Science – “***Soil and the Shared Future for Humankind*”** since both Soil Science and Human Societies are confronted with the greatest and pressing global challenge of past, current and future climate change as well as biodiversity (particularly soil microbial diversity) conservation.