

SSSA-SSSC Joint Webinar on Soils and Climate Change

Cross-cultural and international scientific cooperation is essential as we face global issues of climate change, food security, and environmental restoration. We have much to learn from scientists around the world, and our efforts will be strengthened and more effective when soil scientists are working together. To promote such collaboration and communication in soil science, the Joint Working Group of Soil Science Society of America and Soil Science Society of China is pleased to announce the first scientific meeting jointly sponsored by the two societies.

All are invited to attend the webinar!

Please click the below link to register and attend the conference for free.

Webinar link (registration is required and a personal link will be sent to your email after registration):

<https://www.soils.org/education/SSSA-SSSC-Joint-Webinar/>

Date (U.S. Central Time): February 22, 2023, at 18:30-20:40 PM

Date (China Time): February 23, 2023, at 8:30-10:40 AM

Organizing Committee:

James Tiedje, Xiaoyuan Yan, Sabine Grunwald, Michael Thompson,
Jianwen Zou

Contacts:

Marie Johnston (mjohnston@sciencesocieties.org)

Fang Wang (wangfang@issas.ac.cn)

Conference Program

Opening Ceremony				
Time slot		Speaker	Topic	Moderator
China (23 Feb)	Central USA (22 Feb)			
8:30-8:32	18:30-18:32	Marie Johnston Education Project Manager and Content Creator of SSSA	Technical instruction	Host
8:32-8:35	18:32-18:35	Michael Thompson President (elect) of SSSA Iowa State University	Welcome speech	Fang Wang Chair of International Collaboration Working Committee of SSSC Institute of Soil Science, CAS
8:35-8:38	18:35-18:38	Xiaoyuan Yan Vice president and secretary general of SSSC Institute of Soil Science, CAS	Welcome speech	
8:38-8:40	18:38-18:40	Group photo (screen shot)		
Presentations (20 min+ 5 min)				
8:40-9:05	18:40-19:05	Rattan Lal Ohio State University	Managing soils for adaptation and mitigation of anthropogenic climate change	Jianwen Zou Nanjing Agricultural University
9:05-9:30	19:05-19:30	Xiaojuan Feng Institute of Botany, CAS	Molecular alterations of soil organic matter in alpine grasslands under warming	
9:30-9:55	19:30-9:55	Sabine Grunwald University of Florida	Global assessment of soil carbon	
9:55-10:20	19:55-20:20	Tida Ge Ningbo University	Characteristics of paddy soil: specifics in dynamics in organic carbon cycling	Robert Horton Iowa State University
10:20-10:25	20:20-20:25	James M. Tiedje Michigan State University	Summary	
10:25-10:26	20:25-20:26	Marie Johnston Education Project Manager and Content Creator of SSSA	Closing instruction	

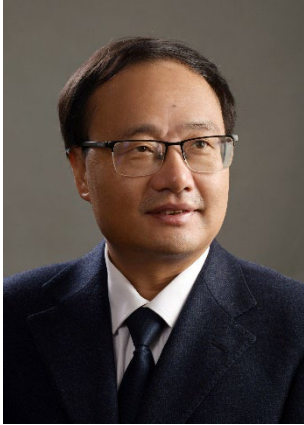
Brief Introduction of Moderators and Speakers



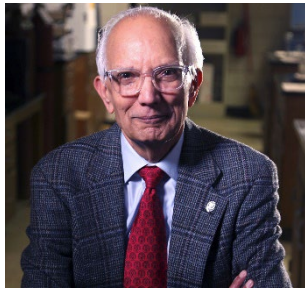
Dr. **Michael Thompson** is the Soil Science Society of America President-elect beginning a three-year succession. He is a professor at Iowa State University where he teaches courses in soil, plant, and environmental chemistry at the undergraduate and graduate levels. His research program centers on environmental applications of soil chemistry and mineralogy. These studies seek to identify chemical and physical conditions that favor stability, transformations, and movement of nutrients, soil organic matter, and the anthropogenic contaminants in soils.



Dr. **James Tiedje** is a Distinguished Professor of Michigan State University, a member of the U.S. National Academy of Sciences, a Foreign Member of the Chinese Academy of Sciences, the Fellow of the American Association for the Advancement of Science, the American Academy of Microbiology, the Soil Science Society of America, and Soil Science Society of China. Dr. Tiedje devoted his life to studying microbial ecology, physiology and diversity, especially regarding the nitrogen cycle, biodegradation of environmental pollutants and use of molecular methods to understand microbial community structure and function, and is a leading expert in the fields of microbial ecology and antimicrobial resistance. He is the former Editor-in-Chief of *Applied and Environmental Microbiology*, *Molecular Biology Reviews* and *mBio*. He has published over 700 papers in international journals, and these publications have attracted over 136,000 citations with an H-index of 176. He was awarded the 1992 Finley Prize from UNESCO for research contributions in microbiology of international significance, the President of the American Society for Microbiology and the International Society for Microbial Ecology and awarded the 2023 ASM Lifetime Achievement Award.



Dr. **Xiaoyuan Yan** is a professor in the Institute of Soil Science, Chinese Academy of Soil Sciences. He is also the vice president and secretary general of the Soil Science Society of China (SSSC) and the director of nitrogen working group of the SSSC. His research interests include nutrients (particularly carbon and nitrogen) cycles in terrestrial ecosystems and their responses to climate change drivers including elevated CO₂ concentrations and warming, mitigation of greenhouse gas and non-point source pollution at various scales. He has published more than 200 papers in peer-reviewed journals, including *Nature*, *Nature Geoscience*, *Nature Food*, *PNAS*, *Global Change Biology*, and *Environmental Science & Technology*, with >12000 citations and h index of 52. He was awarded for “Research Fund of Outstanding Young Scientists” supported by the Natural Science Foundation of China.



Dr. **Rattan Lal** is a Distinguished Professor of Soil Science at the School of Environment and Natural Resources at the Ohio State University. He is a former President of the Soil Science Society of America and the International Union of Soil Sciences, a laureate of the World Food Prize, and serves as Adjunct o Visiting Professor at institutions in Iceland, India, and Chile. His signature research areas include soil carbon sequestration and climate change, soil health and restoration, tropical systems, and conservation agriculture. He received a B.S. from Punjab Agricultural University, a M.S. from Indian Agricultural Research Institute, and a Ph.D. from Ohio State University.



Dr. **Sabine Grunwald** is Professor of Pedometrics, Landscape Analysis & GIS at the Soil, Water and Ecosystem Sciences Department, University of Florida, Gainesville, Florida, USA. She is a SSSA Fellow and internationally recognized for research in pedometrics, carbon science, and soil health. Her research has focused on digital modeling of soil and terrestrial carbon from field to global scale, modeling of soil-ecosystem functions (pedo-econometrics), soil proximal sensing, remote sensing, geoscience, and AI (machine and deep learning) applied to soil health. She earned a M.Sc. in Environmental Science and Development of Rural Areas and a Ph.D. in Environmental Science from the Justus Liebig University in Giessen, Germany and a Ph.D. in Integral and Transpersonal Psychology. She is Chief Editor of *Frontiers in Soil Science*, *Pedometrics Journal*, Associate Editor of *Sensors J.* and had served as Associate Editor of the *SSSA J.* Dr. Grunwald ranked in the top 2% of World Scientists in 2022 (Stanford University Global Ranking List).



Dr. **Robert Horton** is a Distinguished Professor of Soil Science in the Agronomy Department at Iowa State University. His program addresses soil physical processes and soil physical properties, with a focus on coupled heat and mass transfer in soil. His singular contributions include a comprehensive theory of coupled heat, water and chemical transfer in soil, quantifying in situ unsaturated soil hydraulic conductivity and dynamic subsurface water evaporation, and devising and validating a method to control fertilizer nitrogen leaching.



Dr. **Jianwen Zou** is a professor in the College of Resources & Environmental Sciences at Nanjing Agricultural University. Currently, he is the vice president of Soil Science Society of China and the Director of Key Laboratory of Green and Low-carbon Agriculture in Southeastern China, Ministry of Agriculture and Rural Affairs, China. He got two Ph.Ds, one in Soil Science at Nanjing Agricultural University in 2005 and the second one in Ecology at Rice University in 2007. His doctoral thesis was awarded as “National Excellent Doctoral Thesis in China” by the Ministry of Education, China in 2007. His research focuses on agriculture and global change, such as soil greenhouse gases mitigation, response and adaptation of cropland to climate change. He has more than 100 peer-reviewed articles published in decent journals in Chinese and English, such as *Ecology Letters*, *Global Change Biology*, *Global Biogeochemical Cycles*. He was awarded for “Research Fund of Outstanding Young Scientists” supported by the Natural Science Foundation of China in 2012.



Dr. **Xiaojuan Feng** is a Professor at the Institute of Botany, Chinese Academy of Sciences. Her research focuses on the biogeochemical processes regulating the stabilization, transformation, and transport of soil organic carbon under global changes. She is specialized at using biomarkers and compound-specific ^{13}C and ^{14}C analyses to examine organic matter sourcing and processing in soils and fluvial systems. Xiaojuan did postdoctoral work at ETH Zurich and Woods Hole Oceanographic Institution and is currently Subject Editor for *Global Change Biology* and Associate Editor for the Journal of Geophysical Research: *Biogeosciences* and *GCA (Geochimica et Cosmochimica Acta)*. Xiaojuan has a B.S. in environmental sciences, a M.S. in geography/environmental studies, and a Ph.D. in geography. She was awarded for “Research Fund of Outstanding Young Scientists” supported by the Natural Science Foundation of China.



Dr. **Fang Wang** is a Professor at the Institute of Soil Science, Chinese Academy of Sciences, and University of Chinese Academy of Sciences. Her research focuses on soil pollution and remediation, especially for organic chemicals and emerging contaminants. She is the author of more than 190 peer-reviewed journal articles in *The Innovation*, *Environ Sci Technol*, *Water Research* and *Soil Biol Biochem*, etc. She has been awarded the Alexander von Humboldt Fellow for Experienced Researcher from Germany; Shennong Young Talent from the Ministry of Agriculture and Rural Affairs of China; Distinguished Young Scholar from the Natural Science Foundation of Jiangsu, China; and a Young Talent of Lu Jia-Xi Award from Chinese Academy of Sciences. She serves as Co-Editor-in-Chief of *Environmental Technology & Innovation*, Associate Editor of *Science of the Total Environment*, Academic Editor of *The Innovation* and Editor of *Sustainable Horizons*. She is the Chair of International Collaboration Committee of Soil Science Society of China, Co-Chair of Working Group of Collaboration between Soil Science Society of China and Soil Science Society of America.



Dr. **Tida Ge** is a Professor of Environmental Soil Science and Biogeochemistry at Ningbo University with expertise in soil ecology, biogeochemistry, land use, agroecology, and especially nutrient cycling. His research focuses on rhizosphere ecology in agricultural systems and the use of isotopes, sequencing technologies, and biomarkers to evaluate soil functioning. He was awarded “Research Fund of Excellent Young Scientists” from the Natural Science Foundation of China, Newton Advanced Fellowship from The Royal Society of UK, the Alexander von Humboldt Fellow for Experienced Researcher from Germany and a Young Talent of Lu Jia-Xi Award from Chinese Academy of Sciences. He is an active member of several editorial boards. He is Associate Editor for both *Soil Science Society of America Journal* and *Frontiers in Agronomy*, and he’s Editor for *Soil Ecology Letters*, *Biology and Fertility of Soils*, and *Plant and Soil*. He has a Ph.D. in horticultural science from Shanghai Jiaotong University.



Dr. **Marie Johnston** is the Education Project Manager and Content Creator at the Soil Science Society of America, where she manages the North American Proficiency Testing program and develops professional training in soils and agronomy. Prior to this role, Marie served as Assistant Editor for the *Soil Science Society of America Journal*, *Crop Science*, and the *Journal of Environmental Quality*. Her experience includes private consulting as an Environmental Scientist at Wood and research in forest ecology, soil physics, and ecohydrology at the University of Wisconsin-Madison Arboretum. Marie has a B.S. in Water Resources and B.S. in Mathematics from the University of Wisconsin-Stevens Point, and a M.S. in Soil Science and Ph.D. in Soil Science from the University of Wisconsin-Madison.

Presentation Summaries

“Managing Soils for Adaptation and Mitigation of Anthropogenic Climate Change”

by Dr. Rattan Lal

Soils have been sources of carbon to the atmosphere since the beginning of agriculture, and they have lost about 135 Pg C through land use conversion, plowing, drainage, biomass burning, and other activities. With adoption of restorative land use and other best management practices (e.g., conservation agriculture, cover cropping, agroforestry, improved grazing), soils can be an important sink of atmospheric CO₂ through increases in soil organic carbon concentrations and the formation of secondary carbonates. Adoption of restorative land use and soil carbon sequestration practices in the U.S. can be promoted through the forthcoming Farm Bill with provision of a Soil Health Act that rewards farmers through payments for ecosystem services.

“Molecular Alterations of Soil Organic Matter in Alpine Grasslands Under Warming”

by Dr. Xiaojuan Feng

Data from a long-term experiment on the Qinghai-Tibetan Plateau demonstrate that warming enhanced lignin degradation in the subsoil of an alpine grassland, but also promoted the accumulation of lipids and sugars of both microbial and plant origins due to elevated root distribution at depth. Warming and drought also induced nitrogen limitation in the subsoil, which led to decreased efficiency of microbial necromass accumulation. These molecular investigations shed novel light on the stability of various SOC components, deliver a mechanistic understanding for SOC accumulation, and show sensitivity to global changes with have significant implications for improving soil carbon models and predictions.

“Data- and Sensor-driven Modeling of Soil Carbon from Local to Global Scale”

by Dr. Sabine Grunwald

The optimization of soil carbon sequestration and reduction of land-based greenhouse gas emissions are critically important for soil health, food security, carbon (C) accounting, and co-creation of resilient agro-ecosystems. Soils act as sinks or sources of C depending on multiple human and natural factors that vary across spatial scales. Data- and sensor-driven approaches using machine learning and deep learning AI (artificial intelligence) have emerged as powerful forces to model soil C dynamics and patterns in dependence of global climate change, crop types, land use management, and site-specific conditions. This talk presents prominent AI models that quantify soil C storage and soil respiration in the U.S. and at global scale. A discussion will focus on model accuracy, actual vs. attainable (optimized) soil C, and spectral and spatial resolutions of sensors needed to support local land management as well as regionalized C accounting, policies, and marketing.

“Dynamics of Organic Carbon Cycling in Paddy Soil”

by Dr. Tida Ge

Rice paddy ecosystems have the dual functions of serving as carbon (C) sources and C sinks. Therefore, for ensuring China's food security and achieving the goal of "C neutrality", it is of great significance to control the C sequestration and greenhouse gas mitigation of paddy soil. In recent years, research on the process and mechanism of soil organic carbon (OC) turnover in paddies has been carried out all over the world. This talk will summarize the processes and mechanisms of soil C sequestration in paddy soils (e.g., sources, transformation, and stabilization), discuss regulation of OC, and propose strategies regarding achievement of "C neutrality".