

2024 International CFEWS-100K CLIMA WORKSHOP
“CLIMATE-SMART FOOD-ENERGY-WATER NEXUS SOLUTIONS”



Workshop Information

MONDAY, JULY 30, 2024 | 9:00AM -11:30AM (UTC-3)

8:00AM-10:30AM (Eastern Time U.S.)

Meeting Format: Hybrid

UDE. Soriano 959, Montevideo, Uruguay

Zoom Access: <https://tennessee.zoom.us/j/84033529380> password: CFEWS

website: <https://fewsus.utk.edu>

Lead Organizer:

The University of Tennessee, Knoxville, U.S.A.

Technological University, Uruguay

Universidad de la Empresa, Uruguay

U.S. Embassy in Uruguay

SPONSORS



About the CFEWS program: The United States National Science Foundation funded project *Climate-Smart Food-Energy-Water Nexus in Small Farms (CFEWS)* aims to develop innovative, integrated climate-smart food-energy-water nexus solutions based on the principles of circular bioeconomy.



The 100,000 Strong in the Americas Alliance for Climate Action (100K CLIMA) is a signature effort by the Bureau of Western Hemisphere Affairs at the U.S. Department of State (WHA-DOS) and Partners of the Americas (Partners) to catalyze climate action and collaboration at higher education institutions in the U.S. and Latin America and the Caribbean (LAC), equipping the region's future workforce with the skills needed to lead in a climate-positive, 21st century green economy. This green economy must be built on region-wide alliances between industry, governments, civil society, and education institutions working in alignment to prepare the workforce needed to simultaneously reduce emissions, inequality, and poverty. **100K Strong CLIMA Competition to Build Inclusive Climate-Action and Student Exchange Programs between the United States and Argentina, Chile, Paraguay, and Uruguay.** This regional 100K Strong competition is supported by the U.S. Department of State, Bureau of Western Hemisphere Affairs in collaboration with CAF: Development Bank of Latin America (CAF).

Tuesday, July 30, 2024, 9:00 am - 11:20 am (UTC-3)

9:15-11:30	<p>WELCOME & OPENING REMARKS</p> <ul style="list-style-type: none"> • Welcome and Introduction of Workshop David Ader, CFEWS Co-PI (University of Tennessee).
9:15-11:00	
9:15-9:30	<p>Crop production, no-till and cover cropping in Tennessee current and future trends. Forbes Walker, Biosystems Engineering and Soil Sciences, Institute of Agriculture, University of Tennessee, U.S.A.</p>
9:30-9:45	<p>Greener Pastures: Harnessing Grasslands and Grazing for Climate Change Mitigation. Presley Nickels, Biosystems Engineering and Soil Sciences, Institute of Agriculture, University of Tennessee, U.S.A.</p>
9:45-10:00	<p>Unraveling the effect of soil health practices on N₂O emissions and soil microbial communities in long-term cropping systems Facundo Lussich, Biosystems Engineering and Soil Sciences, Institute of Agriculture, University of Tennessee, U.S.A.</p>
10:00-10:15	<p>From Farm to Table: The Role of Sustainability and CEA in Shaping U.S. Consumer Choices for Fresh Herbs. Carlos Uziel Rosales, Agriculture and Resource Economics, U.S.A.</p>
10:15-10:30	<p>Title: Title: “Adapting the Circular Bioeconomy Principles to Farming Systems. David Ader, Smith International Center, Institute of Agriculture, University of Tennessee, U.S.A.</p>
10:30-10:45	<p>Themes: Clean Energy for Net-Zero Transitions Break video https://youtu.be/IySMsYKr8O4</p>
10:45-11:00	<p>Solutions to Increase Supply of Rare Earth Elements for Clean Energy Applications. Deborah Penchoff, Tickle College of Engineering, University of Tennessee, U.S.A.</p>
11:00-11:15	<p>Safeguarding Advanced Reactors. Emma Houston, Tickle College of Engineering, University of Tennessee, U.S.A</p>
11:15-11:30	<p>Closing Remarks, David Ader (CFEWS Co-PI), Sara Mulville (Program Manager)</p>

SPEAKERS



Title: Crop production, no-till and cover cropping in Tennessee current and future trends.

Biography: Forbes Walker received a Ph.D. in Soil Science from North Carolina State University in 1998 and since then has worked as the Environmental Soils specialist for the University of Tennessee Extension. As the Environmental Soil Specialist, he is responsible for coordinating educational and research programs in Tennessee in the areas of the areas of cover crops and soil health, nutrient and manure management, the appropriate use of alternative fertilizer materials, waste utilization, nutrient cycling, water quality and climate smart agriculture. Much of his work today is related to the impact of agriculture on the environment and assessing practices that will improve agricultural productivity without negatively impacting the environment, specifically water and air quality. He has received a number of grants from agencies such as the United States Department of Agriculture (USDA), the Environmental Protection Agency, the Tennessee Valley Authority, National Science Foundation and the Tennessee Department of Agriculture. He currently manages several research and extension projects looking at the impact of agriculture from the plot to field to watershed scale. Since 2023 he has been one of the lead investigators in a regionwide \$30 million Climate Smart Grasslands project with funding from USDA involving partners from nine states across the Southeast.



Title: Adapting the Circular Bioeconomy Principles to Farming Systems.

Biography: Dr. David Ader works as an interdisciplinary scholar in the fields of sustainable agriculture and rural development. He currently works as the Associate Director and Research Assistant Professor in the Smith Center for International Sustainable Agriculture at the University of Tennessee. His expertise and research interests include population dynamics of rural communities, sustainable agriculture development for smallholder farmers, and nutrition sensitive agricultural approaches for development. Ader holds a dual PhD from Penn State University in Rural Sociology and Demography. His current research focuses on rural communities in Southeast Asia, Sub-Saharan Africa, and Central America.



Title: Greener Pastures: Harnessing Grasslands and Grazing for Climate Change Mitigation.

Biography: Presley Nickens is pursuing her PhD in Plant, Soil, and Environmental Science with a Soil Science Concentration at the University of Tennessee. She serves as a Graduate Research Assistant in Dr. Debasish Saha's Biogeochemical Nutrient Cycling Lab, where her dissertation research focuses on enhancing soil health and the climate change mitigation potential of grasslands. Passionate about sustainable agriculture, Presley is dedicated to practices that improve soil and water quality. Her commitment to stewarding agricultural resources aims to address the challenges of feeding a growing population while mitigating environmental impacts.



Title: Unraveling the effect of soil health practices on N₂O emissions and soil microbial communities in long-term cropping systems.

Biography: I am Facundo Lussich, an agronomist from Uruguay. I completed a master's degree in plant science at Universidad de la República, focusing on biological nitrogen fixation in legumes and nitrogen cycling in agricultural systems. Before starting my PhD, I worked as a research assistant at INIA La Estanzuela. Currently, I am pursuing a PhD in Environmental and Soil Sciences at the University of Tennessee, Knoxville. My research focuses on using nitrogen isotopes and molecular methods to understand the biogeochemical mechanisms of soil nitrous oxide (N₂O) emissions in response to long-term conservation practices such as no-tillage and cover cropping.



Title: Controlled environment agriculture (CEA): production challenges, energy efficiency and factors driven demand.

Biography: My name is Carlos Rosales Marroquín, and I am originally from Guatemala. I am proud to be one of the first members of my family to attend university and pursue a postgraduate degree. I earned a scholarship to study at Zamorano University in Honduras, where I completed my undergraduate education. After graduating, I returned to Guatemala and worked on various projects to improve rural communities. Funded by USAID, these projects involved implementing business strategies and utilizing different technologies to enhance local development. Currently, I am pursuing my graduate studies in Agricultural Economics at the University of Tennessee on a scholarship. My research centers on consumer behavior towards different sustainability attributes in the fresh herbs market.



Title: Solutions to Increase Supply of Rare Earth Elements for Clean Energy Applications.

Biography: Dr. Deborah Penchoff is the Associate Director of the Innovative Computing Laboratory, a Research Assistant Professor in the Department of Nuclear Engineering, and a Fellow of the Howard H. Baker Jr. Center for Public Policy at the University of Tennessee. She is an expert at leading multidisciplinary research involving applications of High Performance Computing (HPC), data science, and artificial intelligence (AI) with focus on optimization of separations of rare earth elements (REEs) and actinides. She is an elected officer in the American Chemical Society Division of Nuclear Chemistry and Technology (ACS-NUCL), and a member of the American Nuclear Society (ANS), the Society for Industrial and Applied Mathematics (SIAM), and the Association for Computing Machinery (ACM). She chairs many initiatives focused on accelerating findings through HPC and AI applications and is the editor in chief of *Rare Earth Elements and Actinides: Progress in Computational Science Applications*. She has a PhD in Physical Chemistry with an Interdisciplinary Minor in Computational Sciences.



Title: Safeguarding Advanced Reactors.

Biography: Emma Houston is a graduate student at the University of Tennessee pursuing a Ph.D. in Nuclear Engineering. She is a nuclear nonproliferation and international safeguards fellow where she studies international safeguards for advanced reactors in collaboration with Lawrence Livermore National Laboratory. This work enables advanced nuclear reactor deployability by adapting traditional safeguard approaches to emerging technologies such as pebble bed reactors. She received her bachelor's from the University of Tennessee's nuclear engineering department in 2022. Emma is passionate about nuclear nonproliferation, international safeguards, and the technical and policy challenges associated with both. Outside of research, Emma is the 2024 Nuclear Engineering Student Delegation (NESD) chair which is an organization that advocates on behalf of nuclear energy.

OPENING/ CLOSING REMARKS:



Jie (Joe) Zhuang
CFEWS/FEWSUS Director, Professor
University of Tennessee, Knoxville, USA

Biography: Dr. Jie (Joe) Zhuang is a professor in Department of Biosystems Engineering and Soil Science, director of environmental and soil science graduate studies, and the lead of cluster faculty hire initiative of climate-smart agriculture and forestry at the University of Tennessee (UT), Knoxville, USA. He is also affiliated faculty of UT's Institute for a Secure and Sustainable Environment. Dr. Zhuang has (co)founded four international multidisciplinary research centers, more than ten international research working groups, and one international graduate study program at doctoral level. The graduate program has recruited 40 doctoral students for UT, contributing \$4 million dollars to the graduate programs of 11 UT departments. He has organized or chaired over 40 international transdisciplinary workshops benefiting more than 6,000 researchers and students across the world. He served on many national and international award committees as well as many review panels of national and international funding agencies. Over the past 25 years, Dr. Zhuang has worked on many challenging research projects in the United States, Japan, and China. He was a postdoctoral fellow of Japan Society for the Promotion of Science

(JSPS) during 1998-2000. Dr. Zhuang is a transdisciplinary researcher, and he has rich research experiences in fate and transport of contaminants, soil viruses, soil hydrology, soil carbon sequestration, crop-water relations, and food-energy-water nexus. He created the first course on food-energy-water nexus (ESS 561) in the nation for graduate and undergraduate students in 2020. He has published over 150 refereed articles and book chapters and over 80 conference abstracts. Dr. Zhuang has given more than 40 invited talks worldwide. He has been the editor or editorial board member for 15 international journals and served over 60 international journals as ad hoc reviewer. Currently, Dr. Zhuang leads NSF-funded projects aiming to develop a global research center for climate-smart food-energy-water nexus at varying setting and scales, which involve researchers, students, stakeholders, and policymakers from over 20 countries.

and participatory approaches to capacity development, with a focus on sub-Saharan Africa and Southeast Asia.