

Invited Keynote Speakers' Abstracts and Biographies

Monday, November 15, 2021



Marty Matlock, Ph.D.

Senior Advisor for Food Systems Resiliency at USDA. Executive Director of the Resiliency Center and Professor of Ecological Engineering in the Biological and Agricultural Engineering Department, University of Arkansas– Fayetteville, Arkansas

Country: United States of America

Title: “Building Back Better: Creating a More Resilient Food System for Urban Communities”

Abstract: The Global food system is a remarkably efficient and complex meta-system, delivering nearly 22 trillion kilocalories of food to people across approximately 130 million km² every day. The global food supply chain can be characterized as a metasystem, or a series of systems within systems, forming an intricate and interconnected network. This metasystem has evolved with technological and cultural innovations over the past century to be very efficient. It has also become very fragile, in large part due to the drivers of economic efficiency. President Joe Biden’s executive order on April 21, 2021 (Executive Order 14017) identified critical goals for resilient, diverse, and secure supply chains to ensure our economic prosperity and national security. Urban and peri-urban production will play a critical role in creating resilient prosperity from the land. The barriers to this approach are largely logistic and economic, but can be resolved through coordination, planning, and collaborative investment.

Biography: Dr. Marty Matlock serves as Senior Advisor for Food Systems Resiliency at USDA. He previously was Executive Director of the University of Arkansas Resiliency Center and Professor of Ecological Engineering in the Biological and Agricultural Engineering Department. Dr. Matlock received his Ph.D. in Biosystems Engineering, M.S. in Botany, and B.S. in Agronomy from Oklahoma State University, is a registered professional engineer, a Board Certified Environmental Engineer, and a Certified Ecosystem Designer. His research focus is measuring and managing complex ecosystem processes at local to global scales. Dr. Matlock is the recipient of the 2018 CAST-Borlaug Agriculture Communications Award. He has served on the USEPA Science Advisory Committee for Agriculture, the US Secretary of Agriculture's Committee for the 21st Century, and as sustainability science advisor with conservation organizations and agricultural producer groups. He is a member of the Cherokee Nation and served as Chairman of the Cherokee Nation Environmental Protection Commission for the past 16 years.

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Jiří Jaromír Klemeš, DSc, Dr h c (mult) and George Pólya Professor

Head of a Centre of Excellence “Sustainable Process Integration Laboratory – SPIL”, NETME Centre, Faculty of Mechanical Engineering, Brno University of Technology – VUT Brno

Country: Czech Republic

Title: “Impact of COVID-19 Pandemic on the development of Circular Economy and Food-Energy-Water Nexus“

Abstract: The industry and business are on the way to understand the complicated impacts of COVID-19 on the Circular Economy and identify emerging opportunities triggered by the pandemic. The way ahead demands a continuous analysis of all novel emerging opportunities under careful balancing of savings and increasing demands. Not all novel smart, high-tech

remote/contactless options are energy efficient, and each of them should specifically balance in case-specific conditions. The COVID-19 pandemic has brought new challenges to the Circular Economy efforts. The challenges have several dimensions. One of them is a Food-Energy-Water nexus. The efficiency of reverse logistics of single-use packaging has to be improved significantly in the short run. As a longer-term solution, novel multi-use packaging and containers would be necessary, optimising the number of reuse cycles and the logistics.

Biography: Dr. Klemes is the Co-Editor-in-Chief of Journal of Cleaner Production and Chemical Engineering Transactions, Editor in Chief Cleaner Technologies and Engineering and Cleaner Chemical Engineering; Subject Editor of Energy and Emeritus Executive Editor of Applied Thermal Engineering. Managing Guest Editor of Renewable and Sustainable Energy Reviews. The founder and President for 24 y of PRES (Process Integration for Energy Saving and Pollution Reduction) conferences. Seven years Chairperson of CAPE Working Party of European Federation of Chemical Engineering, a member of WP on Process Intensification. A Member of the IChemE, UK, Sargent Medal International Committee on CAPE. Awarded by the Web of Science and Publons as a Highly Cited Researcher in 2020 again, Top Peer Reviewer and Top Handling Editor. He authored and co-authored 701 papers (WoS) in 101 scientific journals, h-index in Google Scholar 72, in Scopus 63, PUBLONS (WoS) 56. His Publons profile (Web of Science) has 2,242 reviews for 168 scientific journals and 15,026 Editor Merits for 23 Editorial boards. A number of books published by Elsevier, De Gruyter, Woodhead, McGraw-Hill; Ashgate Publishing Cambridge; Springer; WILEY-VCH; Taylor & Francis). Previously the Project Director, Senior Project Officer and Hon Reader at Department of Process Integration at UMIST, The University of Manchester and the University of Edinburgh, UK Founder and a long-term Head of the Centre for Process Integration and Intensification – CPI², University of Pannonia, Veszprém, Hungary. Awarded by the EC with Marie Curie Chair of Excellence (EXC). Track record of managing and coordinating 96 major EC, NATO, bilateral and UK Know-How projects. Research funding attracted over 42 M€.

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Bridget R. Scanlon, Ph.D.

Fisher Endowed Chair in Geological Sciences, Senior Research Scientist, Bureau of Economic Geology, Jackson School of Geosciences, University of Texas at Austin– Austin, Texas

Country: United States of America

Title: “Impacts of Climate Humans on Water Storage Changes in U.S. Aquifers using GRACE Satellite Data”

Abstract: Understanding climate and human impacts on water storage is critical for sustainable water-resources management. Here we assessed causes of total water storage (TWS) variability from GRACE satellites by comparison with climate forcing, particularly droughts and irrigation water use, in major aquifers in the U.S.. Results show that long-term variability in TWS from 2002 – 2020 tracked by GRACE satellites is dominated by interannual variability in most of the major aquifers. Low TWS trends in the humid eastern U.S. are linked to low drought intensity. Although irrigation pumpage in the humid Mississippi Embayment aquifer exceeded that in the semiarid California Central Valley, a surprising lack of TWS depletion in Mississippi is attributed to streamflow capture. Marked depletion in the southwestern Central Valley and south-central High Plains totaled $\sim 90 \text{ km}^3$, about three times greater than the capacity of Lake Mead, the largest U.S. reservoir. Depletion in the Central Valley was driven by long-term droughts (≤ 5 years) amplified by increased groundwater irrigation. Low or slightly rising TWS trends in the northwestern (Columbia and Snake Basins) U.S. are attributed to dampening of drought impacts by mostly surface water irrigation. GRACE satellite data highlight synergies between climate and irrigation, resulting in little impact on TWS in the humid east, amplified TWS depletion in the semiarid southwest and southcentral U.S., and dampened TWS depletion in the northwest and north central U.S.. Sustainable groundwater management benefits from conjunctive use of surface water and groundwater, inefficient surface water irrigation promoting groundwater recharge, efficient groundwater irrigation minimizing depletion, and increasing managed aquifer recharge.

Biography: Dr. Bridget R. Scanlon is among the leading hydrogeologists and conducts research at the Bureau of Economic Geology at the University of Texas at Austin. Her early research concentrated on groundwater recharge, using monitoring, chemical and isotopic tracers, and numerical modelling. She has examined the impacts of climate change and land use change on groundwater, sources and mitigation of natural and anthropogenic contamination, and managed aquifer recharge. Recent research with very high scientific impact includes the interdependence of water and energy and the reliability of global models using GRACE satellite data. Bridget Scanlon has published about 150 papers in refereed journals. She was a Birdsall-Dreiss Distinguished Lecturer and received the M. King Hubbert Award from NGWA and the President’s Award from the International Association of Hydrogeologists. She is a member of the U.S. National Academy of Engineering.

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J.B. Ruhl, J.D., LL.M., Ph.D.

David Daniels Allen Distinguished Chair in Law, Director, [Program on Law & Innovation](#), Co-Director, [Energy, Environment, and Land Use Program](#), Vanderbilt University Law School–Nashville, Tennessee

Country: United States of America

Title: “The Science-Policy Interface of Urban Ecosystem Services: Preparing for Climate Change”

Abstract: Research in ecosystem services has only recently begun to expand its attention beyond conservation and agricultural lands to explore the role of ecosystem services policy for urban social-ecological systems. The science that launched ecosystem services as a broad policy goal in the late 1990s must now “downscale” to provide local decision makers relevant metrics and research to support decision-making “in the field.” This challenge is further complicated by the disruptive effects climate change will impose over relevant urban planning horizons. This presentation traces the history of the science-policy interface of ecosystem services, discusses its emergence in the urban systems setting, and outlines the challenges ahead as climate change disrupts urban social-ecological systems.

Biography: Research in ecosystem services has only recently begun to expand its attention beyond conservation and agricultural lands to explore the role of ecosystem services policy for urban social-ecological systems. The science that launched ecosystem services as a broad policy goal in the late 1990s must now “downscale” to provide local decision makers relevant metrics and research to support decision-making “in the field.” This challenge is further complicated by the disruptive effects climate change will impose over relevant urban planning horizons. This presentation traces the history of the science-policy interface of ecosystem services, discusses its emergence in the urban systems setting, and outlines the challenges ahead as climate change disrupts urban social-ecological systems.

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Moderators:



Gary Sayer, Ph.D.

Distinguished professor emeritus in the Departments of Microbiology, Ecology and Evolutionary Biology and adjunct professor in the Department of Biosystems Engineering and Soil Science, University of Tennessee – Knoxville, Tennessee

Biography: Gary S. Sayer is the distinguished professor emeritus in the Departments of Microbiology, Ecology and Evolutionary Biology and adjunct professor in the Department of Biosystems Engineering and Soil Science at the University of Tennessee, Knoxville (UTK). He is the President and Co-founder 490 BIOTech. He is the founding Director of Center for Environmental Biotechnology (CEB) at UT (1986-2015) and was the first Director of the UT-ORNL Joint Institute for Biological Sciences (JIBS) (2006-2014). As Director for the Waste Management Research and Education Institute *Tennessee Center of Excellence* (1991-2005) he conducted a consolidation and reorganization to create the Institute for a Secure and Sustainable Environment (ISSE) serving as interim director (2005-2006). He served on the Science Advisory Board for the US Defense Department, Strategic Environmental Research Defense Program (2011-2015); and was a member of the US Department of Energy, Biological and Environmental Research Advisory Committee (2008-2013). He served as Executive member and Chair of the Board of Scientific Counselors for the EPA Office of Research and Development (2002-2010) and served on the EPA, Science Advisory Board drinking water committee (2002-2009), the Water Environment Research Foundation Research Council (1995-2001) and was Peer Review Chair for the EPA Exploratory Biology Program (1990-1993). He has served on National Academy/NRC Committees; Evaluating the US EPA Laboratory Enterprise (2013-2014), DOE NRSB-Environmental Management Roadmap (2007-2008), Stand-Off Explosives Detection (2003) and DOE Site Decontamination and Decommissioning (2002). He is Co-founder China-US Joint Research Center for Ecosystem and Environmental Change (JRCEEC), Beijing, (2006-16) and US State Department Ecopartnership (2011-2016) and has held honorary professorships in many

universities worldwide. Gary Sayler was an Associate Editor of *Environmental Science and Technology* (1999-2015) and elected to AAAS Fellowship in 2012 and fellow of American Academy for Microbiology (1995). He received the DOW Foundation Support for Public Health Environmental Research and Education (SPHERE) Award (1998), the Distinguished Alumni Award of University of Idaho (1995), and the Procter and Gamble Prize in Applied and Environmental Microbiology from the American Society for Microbiology (1994) and was named a Top 100 Innovator in Science by *Science Digest* (1985). In 2018 he was designated a Distinguished Researcher “Einstein Professor” by the Chinese Academy of Science. His research interests include microbiology, toxicology, and molecular biology of biodegradation of toxic pollutants such as PCB and PAH. He pioneered the development of environmental molecular diagnostics including the extraction and analysis of nucleic acids from the environment and wastes, environmental gene probe analysis, bioluminescent bioreporter/sensor technology, and conducted the first field release of a genetically-engineered microorganism for remediation process monitoring and control. Over his career, Dr. Sayler has directed and administered over \$100 million of research and guided 100 PhD and MS students and postdocs during his forty-year career; contributing to 410 peer reviewed publications (with a Goggle Scholar h-index of 87 and 25,000 citations), 18 patents, and over 600 lectures and seminars worldwide. A hallmark of his research and training program has been the highly collaborative and interdisciplinary science and engineering approach to hypothesis development, experimental design, and problem solving as exemplified by the research agenda of the CEB. Through JRCEEC, Dr. Sayler extended this commitment to multinational interdisciplinary communication and collaboration. Committed to research as a continuum of the education and learning process; hundreds of students ranging from high school, to undergraduate and graduate have contributed to and gained experience in his laboratory and have moved on to careers in academia, medicine, finance, government and industry worldwide.

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Frank Löffler, Ph.D.

UT/ORNL Governor's Chair Professor, Center for Environmental Biotechnology University,
University of Tennessee – Knoxville, Tennessee

Biography: Frank Loeffler, Ph.D., is the Governor's Chair Professor in the Department of Microbiology and Department of Civil & Environmental Engineering at University of Tennessee. He has a B.S. in Agricultural Sciences and Biology and an M.S. in Microbiology from the University of Hohenheim in Germany, a Ph.D. in Technical Biochemistry and Microbiology from the Technical University Hamburg/University of Hohenheim, and completed a postdoc in microbial ecology at Michigan State University. He is the Principal Investigator for the Biogeochemical Controls over Corrinoid Bioavailability to Organohalide-Respiring Chloroflexi NIEHS R01 grant. His lab focuses on discovering microorganisms and processes to clean the environment, counter damage done to ecosystems by human activity, and improve environmental health. For more information please refer to Dr. Loeffler's lab page.

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Mingzhou Jin, PhD

John D. Tickle Professor, Associate Head, and ISSE Director; Industrial and Systems Engineering, University of Tennessee – Knoxville, Tennessee

Biography: Dr. Mingzhou Jin directs the [Institute for a Secure and Sustainable Environment](#) (ISSE) at the University of Tennessee, Knoxville (UTK) and is a professor and the Associate Head at the Department of Industrial and Systems Engineering. He currently holds the John D. Tickle Professorship. His research interest includes sustainability, climate change, optimization, transportation and logistics, supply chain, additive and smart manufacturing, and energy efficiency. His research has been well sponsored with more than \$8 million in grants and contracts from a board spectrum of federal, local government agencies and corporations including US National Science Foundation, US Department of Energy, US Department of Transportation, US Department of Homeland Security, three state Departments of Transportation, Tennessee Valley Authority, American Trucking Associations, America Makes,

FedEx, Boeing, Lockheed Martin, Nissan, Material Handling Industry, etc. In addition, he has received multiple research, teaching and service awards from professional organizations, Tickle College of Engineering (TCE), and the University of Tennessee, including 2020 UTK Chancellor's Research and Creative Achievement Award and 2020 TCE Research Achieve Award. He also received TCE Teaching Fellow, Outstanding Advising, and Outstanding Service awards in the past five years. He is a fellow of the Institute of Industrial and Systems Engineers. Before joining UT, he worked at Mississippi State University for 10 years, from 2002 to 2011.

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Workshop 1: Urban Water Security and Sanitation

Speakers' Abstracts and Biographies

Tuesday, November 16, 2021

Yongsheng Chen, Ph.D.



Professor and Director, USDA project on Food Energy Water Sustainability, Nutrients Energy Water Center for AGTECH. School of Civil and Environmental Engineering, Georgia Institute of Technology – Atlanta, Georgia

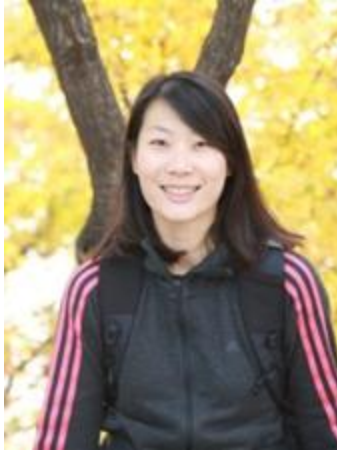
Country: United States of America

Title: “Future Perspectives of Wastewater Treatment”

Abstract: Domestic wastewater is the most abundant, ubiquitously available wastewater, but little to no recovery of nutrients, energy, or water is practiced at-large. Considering the issues raised by current wastewater treatment practice, it is critical to shift our current treatment to a more circular economic practice paradigm, providing recovery nutrient and safe water, reducing environmental impacts and treatment cost. Here, we propose to recover the nutrients and water for decentralized food production using anaerobic membrane biotechnology and controlled environment agriculture. In this aspect, I will share our ideas on newly funded by USDA and NSF-CPS projects.

Biography: Yongsheng Chen is a Professor in the School of Civil and Environmental Engineering at Georgia Institute of Technology, the Director of USDA Project on Food Energy Water Sustainability, the Director of Nutrients Energy Water Center for AGTECH. He also holds a position of an Adjunct Professor at Arizona State University. He earned both his Master and PhD degrees at Nankai University, China. His research interests include nanotechnology for environmental applications and implications, novel membrane technology for sustainable energy and nutrients recovery, and Food-Energy-Water Nexus. Dr. Chen has served as PI/co-PI on sponsored research projects totaling more than \$40M, of which, \$ 18 M has been, or is being, spent in his laboratory. His research has been funded by the DOE, EPA, NASA, NIH, USDA, and NSF. He has published over 175 archival refereed publications. His citation exceeds 14,800 and he has an impressive H-index of 61. He has received many awards, including 2021 CAPEES/Nanova Lifetime Achievement Award, 2020 Georgia Institute of Technology Interdisciplinary Research Award, 2019 Great Teacher Award at Georgia Institute of Technology, 2015 Sigma Xi Best PhD Student Dissertation Advisor Award, and 2014 AEESP Outstanding PhD Student advisor Award. His work has been reported by more than 13 national and international media including Forbes, AEESP, The Atlanta Journal-Constitution (AJC), and Water Environment Federation.

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Jie Liu, Ph.D.

Research Scientist, College of Engineering, Peking University – Beijing

Country: China

Title: “The Water-Energy Nexus of Megacities Beyond Geographic Boundaries: A Case of Beijing, China”

Abstract: The water-energy nexus (WEN) is dynamic and complicated in megacities, most of which are challenged by water shortages and the mandate to reduce carbon dioxide emissions. A salient feature of water and energy services in megacities is that they are supported by a web of regional infrastructure, extending far beyond the geographic boundaries of the cities, resulting in a strong dependence on resources imported from outside. This study provides a quantitative assessment of the WEN of Beijing. Results show that water for local energy production and transformation accounts for 5.6% of its total freshwater use in 2016, and the energy for local water abstraction, supply and treatment accounts for 1.1% of its total energy consumption for the same year. The water for external “imported” energy is 1.3 times of Beijing’s freshwater use for internal energy and keeps increase with the implementation of the energy policy calling for replacing local coal consumption through imported electricity and natural gas. Analysis of WEN beyond the geographical boundaries for megacities illustrates that there are trade-offs in the policy choice between the use of internal and external resources, as well as between importing water and importing energy.

Biography: Jie Liu received her Ph.D. in hydrogeology from the University of Alabama, U.S. in 2007. She was a postdoctoral fellow at Peking University from 2007 to 2009. Since 2009, she has been the research scientist in the College of Engineering (COE), Peking University. Dr. Liu’s major study areas include groundwater flow and transport modeling, basin-scale groundwater management, sustainable water resources management, and water-energy-nexus. Since 2017 she has acted as the Director of Global Exchange Program (Globex) and the Grand Challenges Scholars Program (GCSP) for the education globalization at COE.

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Archileo N. Kaaya, Ph.D.

Professor, Department of Food Technology and Nutrition, Makerere University – Kampala

Country: Uganda

Title: “Sustainable Urban Water Security, Hygiene and Sanitation: A case for Kampala Capital City, Uganda”

Abstract: Water, hygiene and sanitation (WASH) continue to be major constraints in urban centres in Uganda. Kampala Capital City (KCC) is Uganda’s largest city located at the periphery of Lake Victoria, Africa’s largest fresh water lake. Kampala is rapidly growing, with economic opportunities driving the rural-urban migration, and consequently increasing the rate of informal settlements and slums. This has led to increased demand for clean water and several challenges of hygiene, sanitation and waste management. This paper, discusses challenges of the country to sustainably supply clean water and manage hygiene and sanitation to ensure improved livelihood of the populace living in the City. It further discusses opportunities and strategies Government of Uganda has put in place to cope with WASH constraints in KCC.

Biography: Archileo N. Kaaya has teaching and research experience of more than 20 years in the Department of Food Technology and Nutrition, Makerere University, Uganda. He possesses a PhD in Food Science and Technology from Virginia Tech USA/Makerere University and MSc from University of Florida, USA. His main areas of research are Food Safety and quality where he has published widely in international journals. He has been a Principal investigator of several research projects networking with scientists all over the world. He has good experience working with urban and peri-urban communities, to address food and nutrition security issues. He belongs to several technical committees in Uganda including those addressing issues of food quality, safety and nutrition. He has been awarded several consultancies by international organizations like USAID, WHO, FAO and WFP to address Food Safety and nutrition in the country. He has received several awards and, is a Fellow of the Uganda Academy of Sciences.

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Hui Lu, Ph.D.

Department of Earth System Science, Tsinghua University – Beijing

Country: China

Title: “Projecting future flood risks in China Megacity Clusters”

Abstract: Floods are one of the most destructive natural disasters, while climate change will further increase the frequency and intensity of floods. Projecting future flood losses is essential for disaster prevention and mitigation, and also the active response to climate change. China is in the process of rapid urbanization, and most of the megacities and populations are distributed in floodplains, facing severe flood disasters. Using the latest CMIP6 data to drive VIC hydrological model and CaMa-Flood hydrodynamic model, we project the future flood risks of the megacities in China, where more than 700 million people lived in. We find that the urban flood risk in China will dramatically increase in the future, with the extent and timing of the increase varying from region to region.

Biography: Hui Lu is now a tenured associate professor in the Department of Earth System Science, Tsinghua University, Beijing, China. He received his *B.Eng.* and *M.Eng.* degrees from Tsinghua University and a Ph.D. degree in hydrology from The University of Tokyo, Tokyo, Japan, in 2006. His current research interests include the development of the hydrologic model, microwave remote sensing of the land surface, and application of Earth observation data in the water cycle and global change studies. He has published more than 150 papers in journals and conference proceedings. He is a senior member of *IEEE*, a member of the editorial board of *Remote Sensing of Environment*, an associate editor of *Science of Remote Sensing* and *Frontiers in Remote Sensing*. He also was a recipient of the 2015 Best Reviewer Award from Science China Earth Science and the Publons’ 2018 Peer Review Awards in the Geoscience field and Multidisciplinary field

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Alexandros Stefanakis, Ph.D.

Assistant Professor, School of Chemical and Environmental Engineering, Technical University of Crete – Crete

Country: Greece

Title: “Case Studies of Nature-Based Solutions for Sustainable Management of Municipal Wastewater”

Abstract: The circular economy model is viewed today as a new approach to deal with global environmental challenges. Water is a fundamental resource for the human society and the ecosystems that is shared across the entire supply chain. However, the current linear economic model (extraction, use, discharge) has created a series of limitations in freshwater availability, in addition to the wastewater generation and environmental degradation due to climate change. There is a need for a comprehensive plan for the sustainable use of wastewater. Nature-based solutions (NBS) such as constructed wetlands can contribute towards a circular management of water. NBS apply ecological engineering techniques for wastewater treatment with reduced carbon footprint and minimum use of materials, enabling the valorization of the treated effluents for beneficial reuse and recycling, closing this way the loop of water as a natural resource. This presentation will show NBS research and case studies for wastewater treatment in different climatic contexts, where the treated effluents are reused in agriculture and/or recycled in industrial processes.

Biography: Alexandros Stefanakis is an Assistant Professor at the School of Chemical and Environmental Engineering, Technical University of Crete in Greece. He is a Regional Coordinator for Africa and Middle East for the ‘Wetlands for Water Pollution Control’ Specialist Group of the International Water Association. He is the Editor-in-Chief of the Springer journal ‘Circular Economy and Sustainability’, and Associate Editor of other scientific journals. He is an Environmental Engineer and Researcher focusing on water engineering and specifically on nature-based solutions and ecological engineering. He is an expert on sustainable and decentralized water and wastewater treatment systems. He has designed, managed, and

supervised several wastewater treatment facilities across Europe, Middle East, Africa, USA and South America using nature-based solutions such as constructed wetlands. He also studies the principles and the content of circular economy and how this new growth model can be implemented to reach the goal of a sustainable society. In the past, he worked as Researcher and Lecturer at the University of Brighton in the UK, the University of Beira Interior in Portugal, the Helmholtz Center for Environmental Research – UFZ in Germany, and the Democritus University of Thrace in Greece. He also has extensive experience in the industry as he was employed by environmental companies (Ecosafe in Greece, Bauer in Germany & Oman) as Wastewater Specialist-Wetland Expert and Tender Manager. His publication record includes several articles in international scientific journals and conference proceedings, as well as books and book chapters. He is known internationally as an enthusiast of green technologies for water management and reuse, always trying to promote and disseminate such technologies and transfer his knowledge to young engineers and students.

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Michael Eisinger, Ph.D.

Managing Director, Center of Water and Environmental Research, University of Duisburg-Essen

Country: Germany

Title: "Transformation of multiple use urban river systems in a heavily industrialized area"

Abstract: Few urban areas worldwide have repeatedly undergone such fundamental changes over the past 250 years as the Ruhr region in Germany. Accordingly, the development of the Ruhr area impressively illustrates the adaptations of water infrastructure, including the

corresponding surface waters, resulting from various uses. One of the most drastic measures was the conversion of the river Emscher and its tributaries to an above-ground wastewater collection systems due to mining subsidence as a result of the rapid growth of the coal and steel industry. With its end, the Emscher system is now reconstructed as a river ecosystem considering recreational activities for the population and a valorization of land. This transformation process is an impressive best practice example for intelligent, integrated and sustainable water management in booming metropolitan areas of developing and newly industrializing countries which are facing competing uses of water.

Biography: Michael Eisinger studied biology at the Karl Rupprechts University in Heidelberg and marine biology at Northeastern University, USA. He received his PhD from the University of Duisburg-Essen on a coral reef ecology topic with numerous stays in Egypt and Jordan. He then worked in Yemen as a trainer for project staff of UNDP and World Bank projects and as a consultant in environmental impact studies. In 2006, he returned to the University of Duisburg-Essen and has been managing director of the interdisciplinary Center for Water and Environmental Research (ZWU) since 2007. He is coordinating a regional water network including water experts from the academic and non-academic sector.

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Michael Seeger Pfeiffer, Ph.D.

Professor in Biotechnology, Biochemistry and Microbiology at Chemistry Department. Director of the Laboratory of Molecular Microbiology and Environmental Biotechnology and Senior Scientist of the Center for Biotechnology, Technical University Federico Santa Maria – Valparaíso

Country: Chile

Title: “Bioremediation of Hydrocarbon-polluted Soils is Crucial for Urban Sustainability”

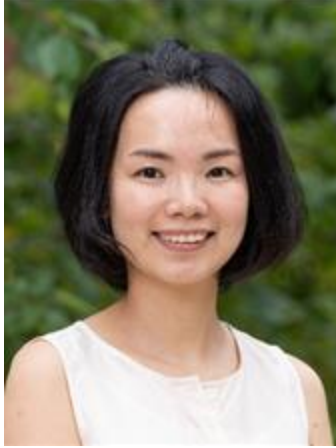
Michael Seeger¹, Constanza Macaya¹, Flavia Dorochesi¹, Ximena Báez¹, Felipe Salazar¹, Patricio Santis¹, Roberto E. Durán¹, Valentina Méndez¹, Vanessa Ayala¹, Myriam González¹ & Roberto Orellana² ¹Universidad Técnica Federico Santa María, Valparaíso, Chile. ²Universidad de Playa Ancha, Valparaíso, Chile. michael.seeger@usm.cl; michael.seeger@gmail.com

Abstract: The clean-up of polluted urban sites is essential towards a sustainable development. Bioremediation is a biological remediation technology of increasing application worldwide and in Latin America. The aims of this study are the application of native bacterial strains for the bioremediation of soils polluted with hydrocarbons. *Pseudomonas*, *Acinetobacter* and *Rhodococcus* strains were studied. Genome-guided analyses reveal their bioremediation potential and the physiological adaptation to pollutants. The genes involved in the catabolism of aromatic compounds and hydrocarbons, and the adaptation to stressful conditions were determined. Bioremediation processes have been established. The clean-up using bioaugmentation and biostimulation of hydrocarbon-polluted soils will be discussed. Based on these studies, site specific bioremediation processes for the clean-up of an urban site in the Valparaíso Region were designed, characterized, and approved by the environmental regulation agency.

Acknowledgments: FONDECYT 1200756, USM and Inmobiliaria Las Salinas grants, RIABIN and FEWSUS networks.

Biography: Michael Seeger Pfeiffer is Full Professor in Biotechnology, Biochemistry and Microbiology at Chemistry Department, Technical University Federico Santa Maria in Valparaíso, Chile. He is Director of the Laboratory of Molecular Microbiology and Environmental Biotechnology and Senior Scientist of the Center for Biotechnology “CBDAL”. He is Biochemist and PhD in Biology of Universidad de Chile. His PhD thesis was conducted at German Research Centre for Biotechnology (Braunschweig, Germany) with Prof. Kenneth N. Timmis and Dr. Bernd Hofer. He is author of >135 scientific publications and 2 books on microbial metabolism and genetics, bioremediation, microbial ecology, bacterial leaching, and synthesis of bioproducts. He is inventor of 5 international patent families. He has guided 15 postdocs, 36 PhD, and 37 Master/undergraduate students. He is Director of the Biotechnology PhD program UTFSM-PUCV, Coordinator of the Latin American Network of Biotechnology PhD programs RIABIN since 2009, and member of Milano-Bicocca Environmental Sciences PhD program (Italy, 2017-2021). He received the “Scopus-Conicyt” award 2013 for the highest impact research in Biology & Biotechnology in Chile, American Academy of Microbiology fellowship (2009), Max Planck Society fellowship (Germany, 2010-2011) and was awarded with the Honorary Membership of the Chemical Society of Cuba (2018). He was president of Latin American Association of Microbiology (2004-2006) and Chilean Society of Microbiology (2004-2008), and co-Chair of First Latin American ISME-LA 2019 meeting (Valparaíso, Chile). Since March 2021 he is director of the Chilean Society of Biology.

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Weiwei Mo, Ph.D.

Associate Professor, Department of Civil and Environmental Engineering, University of New Hampshire – Durham, New Hampshire

Country: United States of America

Title: “Decentralized Urban Water Systems for Enhanced Water and Energy Security”

Abstract: Decentralized, household water systems are increasingly discussed or applied for addressing urban water and energy security issues. However, our understandings regarding the consumer preferences of the decentralized systems, the influence of their adoption on the centralized network, and their optimal spatial distribution remain limited. To address these knowledge gaps, choice experiments were applied to characterize individual preferences, considering the economic costs and environmental impacts of the integration of centralized and decentralized systems. The estimated individual preferences were then used in a spatial agent-based model, designed to model spatially explicit adaptation trajectories and patterns in accordance with utility functions and characteristics of the major metropolitan case study locations. The agent-based model interfaces with a system dynamics model that considers interactions among centralized and decentralized infrastructure systems and characterizes the overall system sustainability and resiliency.

Biography: Weiwei Mo has a BS degree from Shanghai Jiao Tong University in China (2008), and a MS (2011) and Ph.D. (2012) degrees from University of South Florida. She is an associated professor of Civil and Environmental Engineering at the University of New Hampshire. Previously, she was a post-doctoral associate at Yale University. Her research seeks to understand and enhance infrastructure sustainability and resiliency using a systems approach. She has led several National Science Foundation-funded projects, working on integrated planning of water and energy systems, spatial optimization of decentralized infrastructure systems considering user preferences, and crowdsourced monitoring for drinking water safety and resiliency.

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Alex Guerra Noriega, Ph.D.

Director, Private Institute for Climate Change Research– Escuintla

Country: Guatemala

Title: “Water Governance progress after a Crisis: El Niño-triggered Drought and Water conflict in Southern Guatemala”

Abstract: Conflict over the extraction of water from rivers in southern Guatemala was on the brink of violence in 2016. Even though the conflict started over 25 years before, an El Niño-triggered drought played a role in the escalation of conflict. This presentation will provide information on the relationship between precipitation during the rainy season and river flow levels in the subsequent dry season. It explains critical levels of flow in 2016 associated to the very strong El Niño event that took place all through 2015, and how it triggered nearly violent actions. The paper also explains how conflict was managed and led to better water governance in the region. With one of the lowest scores in the level of Integrated Water Resource Management in the continent, Guatemala is likely to face higher levels of conflict despite having abundant water resources. Extreme events, both in terms of drought and flooding, can trigger escalation in water conflicts. The successful case of the rivers in southern Guatemala over five years (2016 to 2021) can provide lessons to advance in water security. Not only has conflict reached low levels but restoration of river flow, restoration of riparian forests, more rational water use, as well as improved community access to rivers have derived. This case can serve as an example of what authors such as Wolf have found in terms of water conflicts around the world, that crises bring about cooperation rather than war, which is radically different from the generalized notion that water wars will be common in the future.

Biography: Alex Guerra has been the General Director of the Climate Change Research Institute in Guatemala since 2010. He holds a Master’s in Water Science, Policy and Management and a PhD in Geography and the Environment, both from the University of Oxford, UK. Alex was a lecturer at a master’s program at the Del Valle University in Guatemala from 2012 to 2017. Previously he worked as a researcher in water resources at the Sierra de las Minas Biosphere

Reserve. He is a Young Affiliate Member of TWAS LACREP 2018, and a member of the National Academy of Medical, Physical and Natural Sciences of Guatemala since 2015. He is author or co-author of several publications on disaster risk, water resources and climate change mitigation and adaptation. In the past two years, he has been the chair of the Guatemalan National Science System on Climate Change (SGCCC).

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John Schwartz, Ph.D.

Professor, Department of Civil and Environmental Engineering and Director of Tennessee Water Resources Research Center, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Development of the Urban Waters Report Card for the State of Tennessee”

Abstract: An Urban Waters Report Card (UWRC) is under development by a state-wide working group effort consisting of Nashville Metro, the cities of Chattanooga, and Memphis, and counties of Hamilton, Shelby, and Knox. Staff from the Tennessee Department of Environment and Conservation (TDEC) are also involved with its development though the UWRC does not have a regulatory focus. The main goal of the UWRC to provide municipal separate storm sewer systems (MS4s) with an assessment tool that can incrementally quantify improvements to watershed/stream quality rather than solely relying on the §303(d) based criteria. The proposed UWRC will provide MS4s communities common assessment protocols to “grade” watershed quality. Grades will be easily interpreted by the public and demonstrate the improvements from the implementation of stormwater control measures and stream restoration projects. The effort includes development of a web site to post the UWRC grades. The proposed UWRC will consist of broad categories (i.e., water quality, watershed hydrology, stream corridor, and social values) and category metrics in which data can be compiled relatively quickly from desktop obtained data, rapid field assessments, and public surveys. The current status of the UWRC development and the plans for beta testing will be presented.

Biography: John Schwartz has over 30 years of experience in academics and professional engineering practice. His research interests include watershed hydrology and sediment modeling, river mechanics, ecological engineering, ecohydraulics, stream restoration, and water quality. He joined the faculty of the Department of Civil and Environmental Engineering at the University of Tennessee (UT) in August 2003. He has a PhD in Environmental Engineering from the University of Illinois at Urbana-Champaign, an MS in Fisheries Science (Water Resources) from Oregon State University, and a BS in Civil Engineering from the University of Missouri at Columbia. Professional experience includes private consulting in the State of Oregon as a licensed engineer, US Environmental Protection Agency (NPDES compliance), and US Peace Corps. Schwartz is an active member of the American Society of Civil Engineers (ASCE), Environmental and Water Resources Institute serving on the Urban Water Resources Research Council and River Restoration and Sedimentation committees.

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Wednesday, November 17, 2021



Pedro J.J. Alvarez, Ph.D.

George R. Brown Professor of Civil and Environmental Engineering. Founding Director of the NSF ERC on Nanotechnology-Enabled Water Treatment (NEWT), Rice University– Houston, Texas

Country: United States of America

Title: "Nanotechnology-Enabled Water Treatment. A perspective for Distributed Treatment and Reuse"

Abstract: Through control over material size, morphology and chemical structure, nanotechnology offers novel materials that are nearly “all surface” and that can be more reactive per atom than bulk materials. Such engineered nanomaterials (ENMs) can offer superior catalytic, adsorptive, optical, quantum, electrical and/or antimicrobial properties that enable multi-functional technology platforms for next-generation water treatment. This presentation will address emerging opportunities for nanotechnology to improve the selectivity and efficiency to remove priority pollutants, decrease electrical energy requirements, and meet a growing need for safer and more affordable decentralized water treatment and reuse. Examples of applicable nano-enabled technologies include capacitive deionization with highly conductive and selective electrodes to remove multivalent ions that precipitate or cause scaling; solar-thermal processes enabled by nanophotonics to desalinate with membrane distillation; disinfection and advanced oxidation using nanocatalysts; and nanostructured surfaces that discourage microbial adhesion and protect infrastructure against biofouling and corrosion. We envision using these enabling technologies to develop compact modular water treatment systems that are easy to deploy and can treat challenging waters to protect human lives and support economic development.

Biography: Pedro J.J. Alvarez is the George R. Brown Professor of Civil and Environmental Engineering at Rice University, where he also serves as founding Director of the NSF ERC on Nanotechnology-Enabled Water Treatment (NEWT). His research interests include environmental implications and applications of nanotechnology, bioremediation, fate and transport of toxic chemicals, water footprint of biofuels, water treatment and reuse, and antibiotic resistance control. Pedro received the B. Eng. Degree in Civil Engineering from McGill University and MS and Ph.D. degrees in Environmental Engineering from the University of Michigan. He is the 2012 Clarke Prize laureate and also won the 2014 AAEES Grand Prize for Excellence in Environmental Engineering and Science. Past honors include President of AEESP, the Perry McCarty AEESP Founders’ Award for Outstanding Contributions to Environmental Engineering Education & Practice, the AEESP Frontiers in Research Award, the WEF McKee Medal for Groundwater Protection, the SERDP cleanup project of the year award, the Brown and Caldwell lifetime achievement award for site remediation, the ASCE Freese Award, and various best paper awards with his students. Pedro has served on the advisory committee of the NSF Engineering Directorate and on the scientific advisory board of the EPA, and is currently an Associate Editor of Environmental Science and Technology. He was elected to the National Academy of Engineering for pedagogical and practical contributions to bioremediation and environmental nanotechnology.

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Miguel Fuentes-Cabrera, Ph.D.

Scientist, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory – Oak Ridge, Tennessee

Country: United States of America

Title: “An Agent-Based Model and a Recurrent Neural Network Metamodel for Investigating the Growth of Sucrose-Exporting Cyanobacteria”

Abstract: Bacteria are used to clean wastewater. Crucial for the success of this process is understanding how bacterial populations grow and how the different species interact. Some years ago, some of us implemented a modeling technique, known as Agent-Based Model, in a high-performance computer code, LAMMPS. This ABM-LAMMPS implementation is called NUFEB, and it has been used many times before to study the growth of bacterial populations important for wastewater treatment. Here we will present results on how NUFEB can also be used to study synthetic microbial populations that can be tuned to produce goods, e.g. biofuels. We will present results obtained for a type of cyanobacteria that secretes large amounts of sucrose, which other bacteria can use for growing. Further, we will present results on how artificial neural networks, in particular Recurrent Neural Networks, can complement NUFEB for predicting microbial growth.

Biography: Miguel Fuentes-Cabrera is a staff member of the Center for Nanophase Materials Sciences, Oak Ridge National Laboratory. He received his Ph.D. in Physics from the University of La Laguna, Canary Islands, Spain. Dr. Fuentes-Cabrera uses computational techniques to study a variety of problems from condensed matter physics to biology to microbiology. During the past year, he has been using machine and deep learning techniques to analyze experimental and simulated images of microbial communities for understanding and then predicting their growth.

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Paolo Zuliani, Ph.D.

Associate Professor, School of Computing at Newcastle University – Newcastle upon Tyne

Country: United Kingdom

Title: “Towards Full-scale Modelling of Microbial Communities Using Individual-based Models”

Abstract: Microbial communities such as biofilms are key players in many wastewater treatment plants. However, we have little understanding of the complex behaviours that can emerge from multispecies communities. This significantly hampers our ability to engineer open microbial systems that efficiently address pressing societal needs such as, eg, water sanitation. In this talk, we present our tool NUFEB (Newcastle University Frontiers in Engineering Biology), a massively parallel simulator for individual-based modelling of microbial communities. NUFEB allows studying population behaviours that emerge from the interaction between individuals and their environment. In particular, NUFEB implements a wide range of biological, physical and chemical processes. We showcase the validation of NUFEB against several biofilm benchmarks from the microscale (10^7 microbes) up to the mesoscale (10^{10} microbes) through the use of machine learning techniques. We conclude with some thoughts on making NUFEB more accessible to microbial modellers.

Biography: Paolo Zuliani is Senior Lecturer (Associate Professor) in the School of Computing at Newcastle University, UK. He received his Laurea degree in computer science from the Università degli Studi di Milano, Italy, and his DPhil in computer science from the University of Oxford, UK. Dr. Zuliani’s expertise lies largely in computational modelling and formal, automated methods for reasoning about computing systems, with an emphasis on systems biology and systems medicine. He is in particular interested in the verification of cyber-physical systems, biological and medical systems, and in efficient techniques for individual-based modelling of microbial systems and of skin diseases (psoriasis).

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Marco Antonio Rodríguez Domínguez

Ph.D. candidate, Department of Biology and the Department of Biological and Chemical Engineering – Process and Materials Engineering Aarhus University – Aarhus

Country: Denmark

Title: “Potential of the Treatment Wetlands in the Latin American and Caribbean region for facing the current wastewater problems”

Abstract: Treatment wetlands (TW) technology is a nature-based solution (NbS), where natural processes are emulated and optimized through engineered designs to improve water quality. TWs are characterized by relatively low establishment costs, robustness, low operational and maintenance investments, and a known capacity to treat a broad range of pollutants and under a variety of climatic conditions. This technology is considered one of the most sustainable technologies for wastewater treatment (WT) if compared to other conventional treatment technologies. TW ‘sustainability’ is substantiated by the fact that TW can successfully improve water quality, but can also provide a multitude of other functions, such as sustaining biodiversity, mitigation of climate change, carbon sequestration, hydrological flow regime regulation, public use, education, habitat conservation and creation among others. TW sustainability have been evaluated in the terms of their capacity to improve water quality of different concentrations and origins, shown to be effective for pollution control in the domestic wastewater, urban runoffs, slaughterhouses, industrial, urban sewage, and others. Due their capacities, TW seem to be a suitable technology for facing the wastewater problems in the Latin-America and Caribbean region (LAC), where it has been estimated that the pollution in rivers and freshwater affects up to one-third of the rivers, and one-seventh of the length of them in the region, and the wastewater treatment and sanitization coverage is lower than 25% in average. TW can bring, if effectively implemented, cheaper and permanently wastewater treatment for the most vulnerable population in the region.

Biography: Marco Antonio Rodríguez Domínguez is currently a Ph.D. candidate at Aarhus University (Denmark) working with the Department of Biology, the Centre for Water

Technology WATEC, and the Department of Biological and Chemical Engineering – Process and Materials Engineering. He is a young researcher and entrepreneur specialized in nature-based solutions for wastewater and waste treatment using constructed wetlands and biorefining processes. In 2009, he finished his bachelor on Environmental Systems Engineering at the Polytechnical National Institute in Mexico. In 2012, he obtained the Master Degree in Water Science at the Mexican Technological Institute of Water in Mexico. In 2020, he wrote the first Latin-American review about Constructed Wetlands, which was published in the Journal *Water*. In 2020 and 2021, he researches the use of biomass of constructed wetlands for the production of high-value products, like protein, cellulose, and bio-crude using the biorefining process. Marco is the founder of Green Growth Group México SA de CV where he leads projects related to constructed wetlands for wastewater treatment, biorefining and bioproducts projects, environmental consultancy, and water rights in Mexico. He has been an independent consultant since 2011, when he founded the firm S.I.S.A. Soluciones Integrales y Servicios Ambientales, which was absorbed by Green Growth Group México SA de CV in 2014. In Latin America, Marco promotes the constructed wetland technology through the Pan-American Constructed Wetland Network Association (Red Panamericana de Sistemas de Humedales), where he serves as the technical secretary.

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Jon Hathaway, Ph.D.

Associated Professor, Department of Civil and Environmental Engineering, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Impervious Connectivity: Impacts on Urban Runoff and Implications for Green Infrastructure”

Abstract: Impervious surfaces and efficient stormwater drainage networks work in concert to collect and convey rainfall quickly to urban stream systems with greater volume, higher pollutant

loading, and higher energies than previously experienced in predeveloped conditions. However, there is still a lack of understanding as to how to quantify urban watershed complexity and connectivity in ways that can be used to advance urban water management. New methods are discussed in this presentation that can enhance urban hydrologic assessments by incorporating high-resolution data and fine-scale processes to better address the spatial variability in surface cover and hydrologic conditions in urban watersheds. A case study from Knoxville, TN, will be used to demonstrate and discuss this new methodology developed to identify impervious areas that are closely linked to downstream resources in urban watersheds, effectively identifying “hotspots” of connectivity that can be targeted with green infrastructure applications.

Biography: Jon Hathaway is an associate professor in the Department of Civil and Environmental Engineering at the University of Tennessee, Knoxville, Tennessee, USA. He received his PhD from North Carolina State University in 2010, where he studied the fate, transport, and removal of indicator bacteria in urban stormwater runoff. After a brief research fellowship at Monash University in Melbourne, Australia, and nearly two and half years at one of the nation’s leading ecological design and consulting firms, he joined the Department of Civil and Environmental Engineering at the University of Tennessee. Dr. Hathaway is a recipient of the National Science Foundation CAREER award and serves as an Associate Editor for the Journal of Environmental Engineering. He is an elected member of both the ASCE EWRI Urban Water Resources Research Council Core Group and the International Water Association Joint Committee on Urban Drainage.

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Juan Carlos Salcedo-Reyes, Ph.D.

Professor, Physics Department, Pontifical Xavierian University – Bogotá

Country: Colombia

Title: “Photocatalytic Activity of TiO₂:N Films Growth by ALD for the Removal of Emerging Contaminants”

Abstract: This study presents an analysis of the photocatalytic efficiency in TiO₂:N thin films grown by atomic layer Deposition (ALD) related to crystalline properties of the film. The study was performed using the time-dependent inactivation percentages for Escherichia coli bacteria, for potential applications in sewage purification.

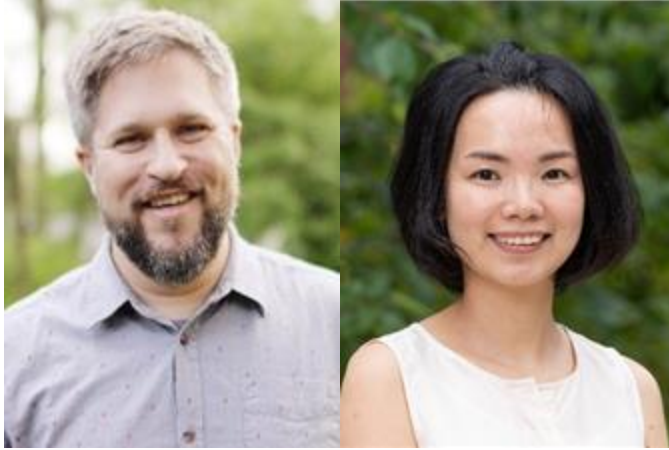
Biography: Juan Carlos Salcedo-Reyes is a full professor in the Physics Department, Faculty of Sciences, Pontifical Xavierian University, Colombia. He received his B.S. and M.S. degrees in Physics in 1997 and 2000, respectively, from the National University of Colombia and Ph.D in 2005 from Cinvestav, México. He did a postdoctoral research of nanotechnology at the University of Texas, Dallas, USA in 2006 and a postdoctoral research of metamaterials at the Materials Science Institute, Madrid, Spain in 2012. His main research interests include semiconductor nanotechnology development and purification of domestic and industrial wastewater using visible semiconductor photocatalysis technologies. A total of 42 refereed publications and 3 patents. Currently, editor in chief of the scientific journal “Universitas Scientiarum” (<https://ciencias.javeriana.edu.co/universitas-scientiarum>)

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Workshop 1 Chairs:

**Dr. Frank Löffler, Dr. Michael Seeger, Dr. Jon Hathaway,
Dr. Weiwei Mo**





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Workshop 2: Sustainable Urban Ecosystems

Invited Speakers' Abstracts and Biographies

Tuesday, November 16, 2021



Dan Childers, Ph.D.

Professor, School of Sustainability, Arizona State University; Director, Central Arizona-Phoenix Long-Term Ecological Research Program – Phoenix, Arizona

Country: United States of America

Title: “An overview of the CAP LTER Program with an emphasis on our social-ecological research on the ecosystem services and bio-cultural services of Urban Ecological Infrastructure”

Abstract: The Central Arizona-Phoenix Long-Term Ecological Research Program has been studying this large metro area since 1997. This urban systems research has always been broadly interdisciplinary and social-ecological, and the ecosystem services that connect “nature in the city” to the city’s inhabitants have long been central to this work. Another central conceptual feature of CAP research is a focus on Urban Ecological Infrastructure (UEI), which is a broad term and idea that encompasses anything in city that supports ecological structure and function; UEI is effectively everything except the actual built environment. In the project presented here, specific types of UEI were chosen for the ecosystem and cultural services—hereafter bio-cultural services—that they provide to nearby residents. Data on resident perceptions and preferences for or against UEI were derived from the Phoenix Area Social Survey. This research addressed the question: What social and environmental features, including proximity to varied UEI, influence perceived bio-cultural services and disservices in PASS neighborhood residents?

Biography: Dan Childers has been a Professor in the School of Sustainability at Arizona State University since 2008. He is the Director of the Central Arizona-Phoenix LTER Program and was the co-Director of the Urban Sustainability Research Coordination Network, both funded by the National Science Foundation (NSF). He is also the Founding Director of the Florida Coastal Everglades Long-Term Ecological Research (LTER) Program. He has served as a Program Officer at the NSF, in the Ecosystems Cluster and LTER Program of the Division of Environmental Biology. He has served on the editorial boards of a number of journals and is currently an Associate Editor for the *Journal of Urban Ecology* and a Handling Editor for *Bioscience*. His research has always focused on wetland ecosystem ecology, urban ecology, and sustainability science. Dan has conducted research in many different freshwater and estuarine ecosystems around the world, including working for nearly 15 years in the Florida Everglades. Since the early 2000s, he has expanded his research portfolio to include social-ecological approaches, urban ecosystems, the ecology-design nexus, water dynamics in cities, urban sustainability, and urban wetlands. Dan has published nearly 140 peer-reviewed articles, book chapters, and books, won grants that have totaled nearly \$40 million, and advised more than 30 Ph.D. and M.S. students.

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Marinus L. Otte, Ph.D.

Professor, Department of Biological Science. Director of the Wet Ecosystem Research Group, North Dakota State University – Fargo, North Dakota

Country: United States of America

Title: “Wetland Restoration and Creation in the Anthropocene”

Abstract: In a world where no place exists that has not been impacted by humans, and pressures on resources are high, how can we ensure sustainable management of water and wetlands? As the human population continues to grow, so does the demand for clean water and food, and space. Wetlands are of vital importance to humans and our environment. How can we integrate wetlands in an increasingly urbanized society?

Biography: [Marinus Otte](#) is a professor of biological sciences at North Dakota State University, Fargo, N.D., USA. He is also Editor-in-Chief of *Wetlands*, (<http://www.sws.org/wetlands/>) an international scientific journal since 2012. The Society of Wetland Scientists (SWS) is an international organization of about 3,500 members dedicated to fostering sound wetland science, education, and management. Dr. Otte has led the Wet Ecosystem Research Group at NDSU since 2006. The group trains graduate and undergraduate students in scientific research, particularly wetlands, plants, biogeochemistry, watershed ecology and metals in the environment. The group collaborates with soils scientists, geologists, environmental engineers, microbiologists, as well as with groups underpinning management of natural resources. He received his master’s and doctorate degrees from Vrije Universiteit, Amsterdam, The Netherlands. Dr. Otte’s research interests include Wetland ecology, biogeochemistry, restoration, pollution, and ecotoxicology.

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Dan Richards, Ph.D.

Researcher, Manaaki Whenua – Landcare Research- Lincoln, New Zealand

Country: New Zealand

Title: “Using Nature to Solve the Global Challenges of Urbanisation”

Abstract: The process of urbanisation has widespread ecological impacts. Many cities face pressing environmental challenges, including elevated temperatures, increased flood risk, and few opportunities for residents to experience nature. Urban ecosystems have the potential to mitigate some of these urban challenges through providing ecosystem services; for example by cooling the air, retaining storm water, and providing recreational spaces for residents. There is increasing interest among planners and designers in better incorporating nature into cities, but we lack an understanding of which nature-based solutions have the greatest potential, and how this varies across climatic and economic contexts in different parts of the world. This talk will present new research that aims to give us a more global, joined-up perspective on the role that nature can play in future cities. It will highlight how new remote sensing and artificial intelligence technologies hold the potential to quantify the role of urban ecosystem services in contributing to human well-being across thousands of cities.

Biography: Dan Richards is a researcher at Manaaki Whenua – Landcare Research, New Zealand. His work looks at how ecosystems provide benefits to people, particularly focusing on cities. Through better understanding the benefits of urban nature, he hopes to inform urban planning to design cities that are safer, more livable, and resilient to future climate change. He has worked previously in Europe and Southeast Asia, and has published over 40 peer-reviewed papers.

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Qiang He, Ph.D.

Professor, Department of Civil and Environmental Engineering, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Understanding the Human-Building-Microbiome Nexus for Sustainable and Healthy Urban Environments”

Abstract: Urban environments are characterized by the concentration of buildings. As humans spend more than 90% of their time in indoors, the built environment is vital for urban sustainability and public wellbeing. Humans, built environments, and microbiomes constitute a system of ecosystems with extensive interactions that impact one another. Understanding the interactions between these systems is essential to develop strategies for effective management of the built environment and its inhabitants to enhance sustainability and public health.

Biography: Qiang He is a professor of environmental engineering at the University of Tennessee, Knoxville, Tennessee, USA. Working toward the goal of “a healthy and sustainable environment”, his recent research endeavors have focused on the development of multidisciplinary research efforts to address issues of sustainability in both natural and engineered environments. Examples of his work include microbiomes of biological treatment processes, urban stormwater management, and resource recovery from waste materials.

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Matt Taylor

Senior Policy Analyst and Business Team Manager, Tennessee Department of Environment and Conservation – Nashville, Tennessee

Country: United States of America

Title: “A Practitioner Perspective on Food System Sustainability’s Complexities in Program and Policy Design”

Abstract: Food systems are complex, interconnected webs of activities, resources, stakeholders, and outputs that collectively produce, process, distribute, and provide food. There is a shared interest in creating food systems that are more sustainable. Sustainable food systems are those that reduce negative environmental impacts, enhance food security, and support the economic vitality of those working in food systems. Designing programs and activities to promote food systems sustainability are nuanced and complex, and often require consideration of local and regional dynamics. These nuances are often not appropriately communicated to consumers. In this session, we will discuss two prominent “sustainable food” messages – to reduce food packaging and to purchase local food – to unpack how these messages can overlook important nuances. Then, we highlight how stakeholders should consider the holistic impact of food system interventions to avoid the trap of overlooking tradeoffs and potential negative consequences.

Biography: Matt Taylor is Senior Policy Analyst and Business Team Manager for the Tennessee Department of Environment and Conservation – Office of Policy and Sustainable Practices. He works with TDEC Divisions and external stakeholders on broad, complex environmental policy issues and is responsible for coordinating TDEC reviews and responses on projects in the state of Tennessee that trigger National Environmental Policy Act requirements. Matt also manages the state of Tennessee’s business and industrial sector facing sustainability programs. Matt holds a master’s degree in Geography from the University of Arkansas, an MBA from Tennessee State University, a BS in Resource and Environmental Studies from Texas State University, a BS in Urban Studies from Tennessee State University, and a certificate in Sustainable Environmental Management from UC Berkeley. In addition to his educational background, Matt has a range of professional experience in environmental sciences from his time working with the U.S. Forest

Service – Rocky Mountain Research Station as well as solid waste regulatory experience from time spent with the TDEC – Division of Solid Waste Management.

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Adam Sochacki, Ph.D.

Postdoc Researcher, Czech University of Life Sciences Prague – Prague

Country: Czech Republic

Title: “Nature-based Solutions for Greywater Reuse in Urban Areas: Benefits, Challenges and Case Studies”

Abstract: The reuse of greywater to meet some of daily water demands in urban areas can bring about number of economic, environmental and community benefits. The efficient treatment of greywater can be achieved by various intensive and extensive methods such as nature-based solutions (green walls, green roofs and treatment wetlands). Apart from water treatment nature-based solutions provide environmental, social and economic benefits, such as biodiversity, reducing heat island and flood risks, resilience, human well-being and aesthetical value. However, the application of nature-based solutions in urban areas is facing some challenges such as: lack of design guidelines, technical issues, unknown risk associated with micropollutants, vagueness in legislation, and poorly defined role within water system and the environment. This presentation will be supplemented with case studies from the Czech Republic (including the campus of the Czech University of Life Sciences Prague) and foreign collaborators.

Biography: Adam Sochacki has been a postdoc researcher at the Wetland Group (group leader: Professor Jan Vymazal) of the Czech University of Life Sciences Prague (Czech Republic) since 2016. He has obtained his PhD degree in 2013 from the Silesian University of Technology (Poland) and Mines Saint-Étienne (France). He has been studying the ability of constructed wetlands to remove organic contaminants from various types of wastewater including greywater and the methods to improve their performance. Recently, he has been involved in the project

“SWAMP – Responsible water management in built-up areas in relation to the surrounding landscape” within a task group focusing on water reuse by green walls and green roofs and he joined the COST programme action “CA17133 – Implementing nature based solutions for creating a resourceful circular city.”

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Daniel Somma, Ph.D.

Senior Researcher, National Institute for Agricultural Technology- Buenos Aires

Country: Argentina

Title: “The Participatory Land Use Planning Process at Parana River Delta, Buenos Aires Province, Argentina”

Abstract: In the Parana River Delta (1.78 Million hectares, Argentina), an inter-institutional Participatory Land Use Planning Process (PLUPP) is being built with both, scientific and empiric farmer knowledge support. This process seeks to find consistent management answers to a changing world. It occurs in one of the principal wetlands Systems of South America that is; also, a key river transport network for three countries (Argentina, Bolivia, and Paraguay). It is, besides, the principal source of freshwater of an urban riverine Region that holds 24 million inhabitants. To safeguard the continuity of the wetlands key ecosystem services production processes (involving e.g.: flooding mitigation, biodiversity conservation, water pollution control, islands silvopastoral systems), there are ongoing different research programs and social networks that are working articulated in PLUPP. These programs and networks are looking forward to alleviating negative effects that arise from current land use and cover change (LUCC) processes across the Region.

Biography: Daniel Somma is a senior researcher at the Argentine National Institute for Agricultural Technology (INTA). He is currently based at INTA’s Delta Experimental unit outside the city of Buenos Aires. He has been Director of the Buenos Aires Norte Regional

Center (2013 – 2016) and President of the National Parks Administration (2019 – 2021). He has served as a consultant for agricultural planning, sustainable forestry production and information systems in different projects of a private and public nature in provincial (Salta, Jujuy, Catamarca, Santa Cruz), national and international (Uruguay, Chile, Bolivia, Paraguay) settings. He has worked as Director or Principal Consultant in projects of the IDB, the GEF (World Bank), the UNDP, the EU, and other international organizations (JICA, AECI).

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Winifred Curran, Ph.D.

Professor, Department of Geography, DePaul University – Chicago, Illinois

Country: United States of America

Title: “A “Just Green Enough” Approach: Urban greening without displacement”

Abstract: Too often urban greening projects are tied to an outward-looking, postindustrial urban growth agenda. This focus ignores interventions which are less visible, smaller scale, and serve a working-class population in still-industrial areas of the city. In this talk, I offer examples of small-scale interventions undertaken by the Newtown Creek Alliance to accomplish demonstrable environmental improvements along the heavily polluted industrial waterway of Newtown Creek in New York City. Though largely invisible within the larger conversation on greening and urban development, these interventions have the potential for substantive environmental improvement that benefits existing long-term residents and users rather than being a tool to attract new residents and luxury development. This example serves as an attempt to diversify the “best practice” case studies that will inform future urban greening projects.

Biography: Winifred Curran is a Professor of Geography at DePaul University. Her work focuses on the effects of gentrification on the urban landscape. She is the author of *Gender and Gentrification* (Routledge 2018) and co-editor, with Trina Hamilton, of *Just Green Enough: Urban Development and Environmental Gentrification*.

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Elena Hidalgo, Ph.D.

Senior Researcher, National Institute of Agricultural Technology – San Juan province

Country: Argentina

Title: “Urban Food Security and Food Sovereignty Issues: Argentina’s Pro-Huerta Program”

Abstract: Established in the 1990s by the Argentine National Institute of Agricultural and Technology (INTA), Pro-Huerta is designed to strengthen urban food security of the most vulnerable groups. The program has been implemented in all Argentine provinces and replicated successfully in several other countries in the region. The program helps strengthen food security and sovereignty based on local food production and marketing through shorter circuits.

Biography: [Elena Hidalgo](#) is a researcher at the Argentine National Institute of Agricultural Technology (INTA) based at the San Juan province Agricultural Experiment Station. Her work involves educational extension, management of territorial development programs and training of human resources. Within the framework of the FOAR Program for Bilateral Cooperation of the Ministry of Foreign Affairs of Argentina, she participated in technical consulting mission for Pro-Huerta Program in Colombia (2002), Grenada (2003), Bolivia (2004), Mexico (2005), Mozambique (2006) and Colombia (2007). She is also a Professor and Researcher at the San Juan National University in Argentina and she is chair for the *Human Ecology lab* in the Department of Sociology – Faculty of Social Sciences and the Extension and *Rural Sociology lab* in the Department of Agronomic Engineering -Faculty of Engineering since. She has a Ph.D. in Human Ecology from Michigan State University.

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Tuesday, November 16, 2021



Alessio Russo, Ph.D.

Senior Lecturer and Academic Course Leader in the Master of Landscape Architecture,
University of Gloucestershire – Cheltenham

Country: United Kingdom

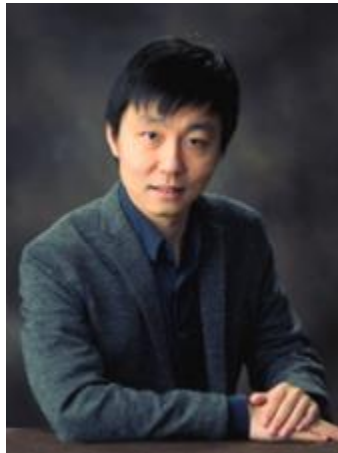
Title: “Urban Ecosystem Services: Toward a Sustainable Future”

Abstract: The school of thought surrounding the urban ecosystem has increasingly become in vogue among researchers worldwide. Since half of the world’s population lives in cities, urban ecosystem services have become essential to human health and well-being. Rapid urban growth has forced sustainable urban developers to rethink important steps by updating and, to some degree, recreating the human–ecosystem service linkage. This talk addresses topics such as ecosystem services, green infrastructure, nature-based solutions, urban green spaces, edible green infrastructure, human health, and more. It highlights current knowledge, gaps, and future research with the focus on building a sustainable future.

Biography: Alessio Russo is Senior Lecturer and Academic Course Leader in the Master of Landscape Architecture at the University of Gloucestershire, Cheltenham, United Kingdom. Before joining the University of Gloucestershire, he worked in Russia as an Associate Professor at RUDN University in Moscow and Professor and Head of Laboratory of Urban and Landscape Design at Far Eastern Federal University in Vladivostok. He holds a Bachelor in Science in Plant Production from the University of Naples, Post-Graduate Specialization in Healing Garden Design from the University of Milan, and Master in Science in Landscape Design and Planning from the University of Pisa. He received his Ph.D. in Urban Forestry from the University of Bologna. Outside of academia, he has worked as a Landscape Architect in the United Kingdom, Italy, and the United Arab Emirates, dealing with sustainable design and planning. He is a member of the International Scientific Committee on Cultural Landscapes ICOMOS-IFLA,

International Federation of Landscape Architects (IFLA) Advisory Circle, and International Union for Conservation of Nature Commission on Ecosystem Management. He also serves as an Associate Editor for the Journal Urban Agriculture & Regional Food Systems

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Lei Zhao, Ph.D.

Assistant Professor, Department of Civil and Environmental Engineering and National Center of Supercomputing Applications, University of Illinois at Urbana – Champaign, Illinois

Country: United States of America

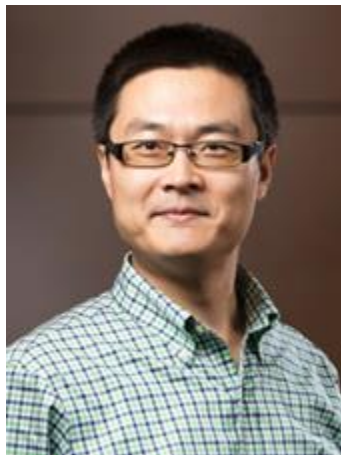
Title: “Global Multi-model Projections of Local Urban Climates”

Abstract: Cities are where major human-perceived climate change impacts occur. Many globally recognized climate threats such as heat stress, water scarcity, air pollution, energy shortage, extreme rainfall, and flooding are either rooted from or exacerbated by the unique urban climatology combined with the concentrated population and infrastructure. These hazardous risks are projected to be further worsen due to climate change coupled with rapid urbanization. Effective urban planning and adaptation for climate-driven risks relies on robust climate modeling that are specific to built landscapes with quantitative characterization of uncertainties. Such projections, however, are largely absent because of a near-universal lack of urban representation in global-scale Earth system models. In this seminar, I will present a newly developed urban climate emulator framework that combines process-based Earth system modeling and data-driven Physics-Guided Machine Learning (PGML), and its applications on understanding the local urban climate change, variability, and uncertainty, and climate impacts to built environments at the global scale.

Biography: Lei Zhao is currently an assistant professor in the Department of Civil and Environmental Engineering and assistant professor affiliated with the National Center of Supercomputing Applications at the University of Illinois at Urbana-Champaign. His research

concerns the physical and engineering processes in the Atmospheric Boundary Layer where most human activities and environmental systems are concentrated, with a particular focus on built surfaces and urban environments. He combines theory, numerical modeling, remote sensing and in situ observations, and cutting-edge machine learning methods to study environmental fluid mechanics and land-atmosphere dynamics that relate to urban environments, microclimatology and hydrology, climate change, climate impacts and adaptation. He has published many peer-reviewed papers in top-ranked journals including Nature, Nature Climate Change, Nature Geoscience, Nature Communications as first author and/or corresponding author. Lei received his Ph.D. (2015) in atmospheric and environmental science from the School of the Environment at Yale University. Before joining at the University of Illinois at Urbana-Champaign, Lei was a postdoctoral research fellow at Princeton University. Lei obtained his B.S. degree (2009) in Physics and Atmospheric Physics from Nanjing University in China.

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Jiafu Mao, Ph.D.

Senior Research Scientist, Earth System Modeling Group, Oak Ridge National Laboratory. Joint faculty Professor, Department of Industrial and Systems Engineering, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Urban Warming Advances Spring Phenology but Reduces the Response of Phenology to Temperature in the Conterminous United States”

Abstract: We investigated the changes in satellite-derived start of season (SOS) and the covariation between SOS and temperature (R_T) in 85 large US cities between 2001 and 2014. We found 1) SOS came significantly earlier in 74 cities and R_T was significantly weaker in 43 cities when compared with surrounding rural areas 2) decreased R_T mainly occurred in cities in relatively cold regions with annual mean temperature <17.3 °C; and 3) urban–rural magnitude difference in both SOS and R_T was primarily correlated with the intensity of urban heat island.

Model simulations further suggested more and faster heat accumulation contributed to earlier SOS, while a decrease in required chilling led to a decline in R_T magnitude in urban areas. These findings provide observational evidence of a reduced covariation between temperature and SOS in major US cities, implying the response of spring phenology to warming in nonurban environments may decline in the future.

Biography: Jiafu Mao is a senior research scientist in the Earth System Modeling Group at Oak Ridge National Laboratory, and a joint faculty professor in the Department of Industrial and Systems Engineering of University of Tennessee. He has been interested in the quantification of hydrology, carbon cycling, and vegetation dynamics in the terrestrial ecosystems using field measurements, satellite products, process-oriented land surface and Earth system models, and various statistic methods including the machine learning techniques.

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Joshua S. Fu, Ph.D.

Tickle Professor and Gibson Professor, Department of Civil and Environmental Engineering. Inaugural Professor, UT-ORNL Bredesen Center, University of Tennessee, Knoxville. Joint Appointment Professor, Computational Sciences and Engineering Division, Oak Ridge National Laboratory – Oak Ridge, Tennessee

Country: United States of America

Title: “Lessons and Opportunities for integrated Engineering and Earth Systems Science as Solutions to Water in a Changing Climate”

Abstract: Climate change is happening. Climate change is no longer a hypothesis. It is a fact. The solutions are expected to be developed. To develop a framework for a systems approach to studying the Earth and to identify facilities, infrastructure, coordinating mechanisms, computing, and workforce development needed to support future work, it bridges the gap between engineering and earth systems science to share successful strategies and discuss challenges.

Making further progress will require lowering institutional and cultural barriers to engagement across traditional scientific disciplines and advancing transdisciplinary efforts that foster greater understanding of the interdependencies among the Earth system components. There are examples, Practicable predictions of water quality and quantity, as well as floods and droughts, require data-driven models and smart sensing systems. Exascale computing, edge computing, and 5G offer the promise to accelerate scientific discovery and revolutionize engineering approaches through data-driven and physics-constrained to build a next-generation civil infrastructure

Biography: Joshua S. Fu is the Tickle Professor and Gibson Professor in the Department of Civil and Environmental Engineering of The University of Tennessee Knoxville, USA. He is also the Inaugural Professor of the UT-ORNL Bredeesen Center, Joint Appointment Professor in the Computational Sciences and Engineering Division at Oak Ridge National Laboratory. Prof Fu has served Vice-Chair of the Measurement Model Fusion for the Global Total Atmospheric Deposition (MMF-GTAD) of the new initiative in the World Meteorological Organization (WMO), contributed as a co-author of the Final Report of the Hemispheric Transport of Air Pollution (HTAP) for the UN ECE, AMAP Short Life Climate Forcers Report of the Arctic Council and reviewing committee member for air quality status in East Asia under EANET. He also contributed to climate modelling results for IPCC AR5 based on RCP 4.5 and 8.5 scenarios. The focus of Prof Fu's research work includes air quality, climate change, energy, and human health. Additional focus is to utilize artificial intelligence and machine learning techniques on climate change, human health, and mapping global total atmospheric deposition. Currently, his research team is deploying a chemistry solver for a new ESM and improve the climate-chemistry model on global and regional scales and downscaling to a 4 km resolution. Dr. Fu has received numerous awards from national and international associations and is a recipient of the Fellow of the AAAS and A&WMA, Board Certified Environmental Engineering Member of the AAEES, and other distinguished and endowed professorship awards. He has published more than 170 refereed journal articles and 120 conference proceedings, more than 200 invited talks and keynotes, and serving journal editors.

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Virginia Dale, Ph.D.

Adjunct Professor, Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, Tennessee

Country: United States of America

Title: “Best Practices in Community and Stakeholder Engagement”

Authors: Virginia H Dale¹, Andrew Kliskey², Paula Williams², David L. Griffith², Chelsea Schelly³, Anna-Maria Marshall⁴, Valoree S. Gagnon⁵, Weston M. Eaton⁶, and Kristin Floress⁷

¹ Department of Ecology and Evolutionary Biology, University of Tennessee Knoxville, 37996, USA; vdale@utk.edu, ²Center for Resilient Communities, University of Idaho; Moscow, 83844, USA: paulawilliams@uidaho.edu (P.W.); griffith@uidaho.edu (D.L.G.), ³Department of Social Sciences, Michigan Technological University; Houghton, 49931, USA; cschelly@mtu.edu, ⁴Department of Sociology, University of Illinois Urbana-Champaign; Urbana, 61801, USA; am-arshll@illinois.edu, ⁵College of Forest Resources and Environmental Science and University-Indigenous Community Partnerships, Great Lakes Research Center, Michigan Technological University; Houghton, 49931, USA; vsgag-non@mtu.edu, ⁶Department of Agricultural Economics, Sociology, and Education, Pennsylvania State University; University Park, 16802, USA; wme107@psu.edu, ⁷United States Department of Agriculture Forest Service; Evanston, 60201, USA; kristin.m.floress@usda.gov

Abstract: Community and stakeholder engagement is essential to science at the nexus of food, energy, and water systems (FEWS). Local knowledge contextualizes complex interactions among food, energy, and water systems and helps identify more effective solutions. Based on a review and meta-synthesis of a broad range of existing models, frameworks, and toolkits for community and stakeholder engagement, a framework is proposed for best practices in community and stakeholder engagement in FEWS. The framework includes situational awareness of the FEWS place or problem, creation of a suitable culture for engagement, focus on power-sharing in the engagement process, co-ownership, co-generation of knowledge and outcomes, the technical process of integration, monitoring processes of reflective and reflexive experiences, and formative evaluation. The framework is considered a scaffold to support the development and application of best practices in community and stakeholder engagement in ways that are essential for sound FEWS science and sustainable management of ecosystems for human use.

Biography: Virginia Dale is a landscape ecologist in the Department of Ecology and Evolutionary Biology at the University of Tennessee. She has served on scientific advisory boards for five US agencies and several committees of the National Academies of Science. She contributed to the 2007 IPCC Scientific Assessment that received the Nobel Peace Prize. She is a Co-PI on the National Science Foundation project Engage INFEWS: A Research Coordination Network for Community and Stakeholder Engagement Critical to Food, Energy, and Water Systems.

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Andrea Ludwig, Ph.D.

Associate Professor, Biosystems Engineering and Soil Science, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Natural Drainage Systems to Restore Ecosystem Services in Residential Landscapes”

Abstract: The urban water cycle is plagued with imbalances that can act as stressors to the ecosystem. Managing water quantity and quality in urban and urbanizing watersheds through natural drainage systems may lessen that impact and help restore ecosystem services that have been lost. Natural drainage systems are an alternative to grey infrastructure for managing stormwater runoff through redesign of residential areas to take advantage of the natural capacity of plants, soil, and the landscape to clean runoff and manage flows. Rain gardens, bioswales, created wetlands, and permeable pavements are all components that may be used in a natural drainage system. Innovative design is needed that addresses unique ecoregion conditions as well as across a range of built environment applications. Just as important are the human elements of acceptance by residents and maintenance and management by those responsible for their long-term effectiveness. This talk will explore the physical, ecological, and human dimensions of natural drainage systems and showcase some case studies in East Tennessee, USA.

Biography: Andrea Ludwig is an Associate Professor of Ecological Engineering in the Biosystems Engineering & Soil Science Department at the University of Tennessee. She has served as the State Stormwater Management Specialist for UT Extension since 2010, and in that role, works with local municipal governments to help support their green infrastructure programs. She is the co-director of Tennessee Smart Yards, which is an sustainable landscaping educational program that seeks to certify private property across the state as “Tennessee Smart Yards.” She serves as the current Chair of the Watershed Faculty Consortium at UT, is a long-

time member of the American Ecological Engineering Society, and is the faculty co-advisor for the student club the Hydrolunteers. She has received the BESS Outstanding Service Faculty Award twice and the Hicks Outstanding New Extension Worker Award. She holds a Bachelors of Science in Biological Engineering and Masters of Science in Environmental Engineering from the University of Arkansas and a PhD in Biological Systems Engineering from Virginia Tech.

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Workshop 2 Chairs:

Dr. Jie (Joe Zhuang), Dr. Marinus Otte, Dr. Lei Zhao



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Workshop 3: Rural-Urban Co-Prosperity

Invited Speakers' Abstracts and Biographies

Tuesday, November 16, 2021



Jennifer Tribble

Senior Policy Analyst, Tennessee Department of Environment and Conservation – Nashville, Tennessee

Country: United States of America

Title: “Promoting Sustainability and Resilience Through Community Engagement and Technical Assistance”

Abstract: Communities that are sustainable and resilient are those that can confront changing conditions, absorb disturbances with flexibility, and utilize existing resources and local partnerships to achieve community goals without compromising the ability of future generations to meet their own needs. Sustainability and resilience engage all aspects of community life: government, business and industry, jobs, food systems, natural environment, water resources, energy, housing, health care, education, transportation and infrastructure, workforce development, and more. In this session we will explore a Tennessee Department of Environment and Conservation pilot program, Sustainable Resilience for Communities, and the community engagement and technical assistance resources it makes available to participants. Then, we will review specific resources developed for one participant in the program that focus on building community knowledge about local solutions for achieving waste reduction and diversion. The session will close with potential actions that communities can take to consider opportunities to enhance sustainability and resilience.

Biography: Jennifer Tribble is a Senior Policy Analyst with the Office of Policy and Sustainable Practices. Jenn’s work involves providing technical assistance to communities and the hospitality sector, assisting the department on environmental justice topics, and engaging with TDEC Divisions and external stakeholders on environmental policy issues. Jenn holds a PhD in Neuroscience from the University of California, Los Angeles, with a dissertation focused on the effects of stress on the brain. Jenn also holds a BS in Chemistry and a BS in Microbiology from the University of Texas. Prior to joining TDEC, Jenn worked broadly on science policy and science communication at Duke University. Jenn is passionate about sustainability and

leveraging her behavioral science background to build successful programs and policies to encourage sustainable practices.

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Andrea Hicks, Ph.D.

Associated Professor, Department of Civil and Environmental Engineering and the Director of Sustainability Education and Research, University of Wisconsin – Madison, Wisconsin

Country: United States of America

Title: “Aquaponics as a Sustainable closed loop Food Production System: rural and urban applications”

Abstract: Aquaponics is a closed loop food production system where seafood and plants are grown symbiotically. A major advantage of these systems when compared to conventional agriculture are their relatively small footprints, reduced water usage, and lack of nutrient run off. At the same time, there are other environmental impacts to consider, such as the use of forage fish in aquafeeds. Life cycle assessment is utilized to explore the environmental impacts and sustainability implications of these systems.

Biography: Andrea Hicks is an associate professor at the University of Wisconsin-Madison in the Department of Civil and Environmental Engineering and the Director of Sustainability Education and Research for the University of Wisconsin-Madison. She earned her BS in environmental engineering from Michigan Technological University in 2009, her MS from Clemson University in 2010, and her PhD in Civil Engineering from the University of Illinois at Chicago in 2014. Her work investigates the environmental impacts and sustainability implications of emerging technologies, including nutrient recovery, closed loop agriculture, autonomous vehicles, engineered nanomaterials, bioplastics, and alternative energy. She utilizes tools such as life cycle assessment, techno economic analysis, and agent-based modeling to

explore these technologies. She recently received a National Science Foundation CAREER award to study the sustainability of closed loop agriculture systems.

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Kellie Walters, Ph.D.

Assistant Professor, Department of Plant Sciences, Institute of Agriculture, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Improving the Feasibility of Indoor Agriculture: Light intensity during lettuce seedling production”

Abstract: Indoor agriculture creates the potential to improve the resiliency of our food systems by diversifying production geographically, providing highly consistent plants year-round, and creating the potential for production “optimization”. However, the economic feasibility of indoor agriculture is often in question due to 1) high capital and operating costs and 2) the “optimal” growing environment is largely unknown. In 2019, 35% of controlled environment agriculture (CEA) producers in the United States grew lettuce. In this study we explore light intensity optimization of lettuce seedlings during indoor production and subsequent growth and quality when finished in a common environment. Environmental optimization during the seedling phase is crucial to improving profitability because plant density is greater and fixed growing costs such as lighting can be spread across more plants.

Biography: Kellie Walters is an assistant professor in the Department of Plant Sciences at the University of Tennessee where her research team focuses on food crop physiology in controlled environments including greenhouse and indoor production systems, spanning from potted culture to hydroponics. The overall goal is to determine how to leverage environmental controls (light intensity, duration, and quality, temperature, and CO₂), plant nutrition, and plant growth regulators and hormones to improve vegetable, leafy green, and culinary herb production

efficiencies, yield, and crop quality. In addition to general physiology and production research, her lab is focusing on in-house analysis of secondary metabolites contributing to crop flavor and nutritional value to improve taste, appearance, overall consumer appeal, and producer profitability and sustainability.

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Sebastian Grenoville

Technical Director of Conservation National Parks Administration– Buenos Aires

Country: Argentina

Title: “Productive and Commercial Networks of mall and family producers in the Metropolitan area of Buenos Aires, Argentina”

Abstract: Food security and justice are central elements to understanding the conditions of production and economic reproduction of small-scale producers in the metropolitan area of Buenos Aires, Argentina, This talk discusses and analyzes the ability of vulnerable population sectors to enter distinct markets through complementary commercial channels. It describe a series of explanatory dimensions which allows understanding of these phenomena: 1)The informality which with the sector operates, in two senses; on one hand, weakened barriers, permit new players to gain entry, but at the cost of limited inclusion that leads them to reproduce in the margins of the normative and controls and in marginal spaces (areas that are remote of difficult to access). 2)Governance and access to markets allow not only for economic growth, but for organizational and social growth also. This is reflected in better negotiating capacity and autonomy in decisions at different levels of government, of the chains and inside the organizations. Finally, 3)Emerging disputes arise to provide value to and increase visibility of quotidian practices by the actors of the territory.

Biography: Sebastian Grenoville graduated with a bachelor degree in Sociology from the University of Buenos Aires and has a MSc in Comparative Politics in Latin America from the

London School of Economics and Political Science in the United Kingdom. He is a Ph.D. candidate in Development Studies at the University of the Basque Country. He held management positions at the National Institute of Agricultural Technology (INTA) and the National Parks Administration (APN). His focus is on rural development, vulnerability, social inclusion, marketing and food supply. He currently serves as Technical Director of Conservation for the APN and is a lecturer at the University of Buenos Aires. He is involved in various national and international research projects and action networks including Justice and Food Sovereignty in the Americas; Contested Territories; Food, Energy and Water for Sustainable Cities.

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Lorenzo Pugliese, Ph.D.

Researcher, Department of Agroecology, Aarhus University – Tjele

Country: Denmark

Title: “End-of-pipe Solutions for Agricultural Drainage Management”

Abstract: Agricultural tile-drainage is a major source of N and P for surface waters, thus largely contributing to eutrophication. To reach the water quality goals set by the European Water Framework Directive, the nutrient loads from farmlands in Denmark and most European countries need to be markedly reduced. In the past decade, constructed wetlands and woodchip bioreactors have been progressively used in Denmark as edge-of-field measures. More recently, compact filter systems have been introduced and tested for targeted purposes. Long-term monitoring of these systems to date has demonstrated a large variability in the nutrient removal performance. The climate in Denmark is rather variable, which largely affect the denitrifying activity, nutrient load and dominant forms, and HRT in the systems. Thus, novel strategies aiming to cope with these environmental factors are urgently needed not only to stabilize the annual treatment performance, but also to ensure predictability.

Biography: Lorenzo Pugliese has a PhD degree from Aalborg University (Denmark) on environmental engineering with specialization on the multi-linkage between the fundamental mechanisms of transport and the porous media physical properties. Since 2014, he has been employed at Aarhus University (Denmark) initially as a postdoc and currently as an academic employee. In 2020, he participated as an experienced researcher in a H2020-MSCA-RISE-2018 led by the University of Calabria (Italy) and had a 3-month stay at Universidad Adolfo Ibanez (Chile). The earlier-research interest lay primarily on understanding and exploring the processes governing gas and solute transport in different media. These processes are of utmost importance in a large number of important applications such as transport and removal of contaminants in cleaning filters, removal of unwanted suspended materials, salt water intrusion into fresh water bodies, movement of pollutants in soil. Today, the primary research focus is on edge-of-field technologies for treating nutrient losses (primarily nitrogen (N) and phosphorus (P)) from agricultural drainage waters. These technologies include constructed wetlands, woodchip bioreactor and compact filter systems. He has great interest in the hydrological characterization of these technologies through the use of tracer tests and numerical modeling, in order to improve the system nutrient removal performance. Moreover, the latest works focused on the role of many environmental factors (i.e. climate, hydraulic retention time, nutrient load and dominant forms) on the biogeochemical transformations of carbon, N and P. Lorenzo has a good publication record and a large research network.

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David Ader, Ph.D.

Assistant Research Professor and Assistant Director, Smith Center for International Sustainable Agriculture, Institute of Agriculture, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Rural to Urban Sojourning: Benefits to the Food System in Cambodia”

Abstract: There is a pressing global need to increase the diversification of agricultural systems in order to improve human nutrition and agricultural resiliency. Agriculture is the traditional mainstay of Cambodia's economy as the vast majority of its population (~75%) live in rural areas and participate in agriculture. Despite decades of significant economic growth, rural poverty remains a concern, particularly the role of food and nutrition security. Over half of Cambodian's are under the age of 30 and this predominantly young, rural population is migrating from rural areas seeking out better opportunities for employment and education. In general, we are asking, what social, economic and political factors are shaping and re-shaping the lived experience of rural Cambodians and how are they responding to and adapting to these changes? In particular we are interested in how short-term migration, or sojourning, changes the food system in Cambodia. This research highlights the need to understand the rapid transformation of Cambodian society, especially the changing rural demographics.

Biography: David Ader works as an interdisciplinary scholar in the fields of sustainable agriculture and rural development. He currently works as the Assistant 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 PH.D 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.

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Esther Parish, Ph.D.

Researcher, Oak Ridge National Laboratory – Oak Ridge, Tennessee

Country: United States of America

Title: “How does Bioenergy Influence Urban-Rural Interactions?”

Co-Authors: Keith Kline, Rebecca Efroymson, Matthew Langholtz, Tim Theiss, Erin Webb

Abstract: Given the pressing need for decarbonization to help mitigate climate change, research at Oak Ridge National Laboratory supported by the US Department of Energy (DOE) Bioenergy Technologies Office (BETO) examines ways in which transitioning from fossil fuels to renewable biomass resources may affect communities across the United States. ORNL has worked to define, measure, and visualize indicators to better quantify and assess effects and trade-offs associated with bioenergy. Research continues to analyze the distribution of environmental and socioeconomic costs and benefits among communities to identify opportunities that advance environmental justice, climate justice, and energy justice. This presentation will share results from recent studies on available agricultural and forest biomass resources with examples from the Southeast US wood pellet industry and assessments for economically distressed counties of the Appalachian region.

Biography: Esther S. Parish has been a researcher with ORNL's Environmental Sciences Division since 2010 and currently leads interdisciplinary research projects for the US Department of Energy's Office of Energy Efficiency & Renewable Energy (DOE EERE). Her primary research interests include utilizing geographic information science and integrated models and datasets to assess (1) potential synergies and tradeoffs between environmental and socioeconomic indicators of sustainability for renewable energy resources and (2) potential climate change impacts on human populations and water resources. With a Ph.D. in Energy Science & Engineering through the Bredesen Center for Interdisciplinary Graduate Research and Education, an M.S. in Geography from The University of Tennessee, and B.S. in Geology & Geophysics from Yale University, Dr. Parish has expertise in landscape ecology, sustainability science, watershed hydrology, and pollution prevention. Dr. Parish has published over 35 articles in journals including *Applied Energy*, *PNAS*, *Ecology & Society*, *Ecological Indicators*, *Environmental Management*, and *Computers & Geosciences*. She was recently named a 2021 Clean Energy Education & Empowerment (C3E) Finalist in the category of "Social, Economic, & Policy Innovation."

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Kathryn (Kat) McDearis

Green Heron Compost Services – Knoxville, Tennessee

Country: United States of America

Title: “The Business of Composting: A *Science-First* Business Model”

Abstract: Businesses are traditionally buyer-focused, meaning companies develop business strategies centered around obtaining more customers and higher profits. While income and profits are inarguably essential to a successful business, focusing on buyers first can lead to practices that contradict sustainability science. For example, “Greenwashing” is when a product is marketed to buyers as “green” or “eco-friendly” but in reality is far from sustainable. In this presentation, we will examine how Green Heron Compost Services approached these issues by using a “science-first” model when starting a business. We will discuss details about the business model, the challenges we faced, and strategies we developed to make the company as sustainable as possible.

Biography: Kathryn (Kat) McDearis is the owner and founder of Green Heron Compost Services, an environmentally-focused company that collects food waste and other organic matter from the community to divert waste away from landfills. The waste is transported to various partner farms and local sites to be turned into compost that is used as soil fertilizer.

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Jamie Greig, Ph.D.

Assistant Professor, Department of Agricultural Leadership, Education and Communications,
Institute of Agriculture, University of Tennessee

Country: United States of America

Title: “The Tech Divide in Agriculture: How the Rural-Urban Technology Gap threatens Farm Sustainability”

Abstract: Agricultural Information and Communications Technology (ICT) has become an increasingly essential piece of farm sustainability. Implementation of technology allows for more precise measurements, improves farm management practices, enables automation, and connects farms to a variety of digital services from online marketing to information sharing and analysis. However, access to technology is not equal. Rural areas lag behind urban both in access to connectivity that enables ICT deployment and also the resources, including knowledge, time, and costs, that are required to adopt and integrate these technologies. Large agricultural corporations are increasingly taking advantage of the benefits of ICT deployment in agriculture both to increase profits as well as to achieve sustainability targets. The widening gap between those who are able to integrate ICTs and those who are not threatens the existence of those who are left behind. In order to close the technology gap and reduce the impact on small rural farms we must examine the systems and practices required to improve technology equity in agriculture.

Biography: Originally from Scotland, Jamie Alexander Greig received his PhD in communication and information, focusing on electric cooperatives as a solution to broadband access in rural areas, from the University of Tennessee having already received an MS in communication and information from UTK. Greig’s primary area of focus is information and communications technology (ICT) access, adoption, and utilization in the agricultural sector and rural areas. His studies examine broadband and other communication network access and their impact on precision agriculture, rural communities, as well as the adoption and utilization of digital communication technologies. Greig is a Research Fellow at the Howard H. Baker Jr. Center for Public Policy at the University of Tennessee, is Vice Chair of the UTIA Faculty Innovation Council, and has served as the Communications Director for the Law and Policy Division of the Broadcast Education Association

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Wednesday, November 17, 2021



Bernard Engel, Ph.D.

Senior Associate Dean of Agricultural Research and Graduate Education, Professor Agricultural & Biological Engineering, Purdue University – West Lafayette, Indiana

Country: United States of America

Title: “Sustainable water-food-energy systems at urban-rural interfaces”

Abstract: Urban-rural co-prosperity is essential for the sustainability of urban and rural areas. In many instances, some of the largest challenges of these communities occur at urban-rural interfaces. In such areas, common challenges with water resources issues including excess runoff and water quality often occur. Hydrologic/water quality models combined with other tools provide opportunities to design sustainable water-food-energy systems at urban-rural interfaces as well as within rural and urban areas. Application of some of these tools focused on addressing water challenges will be explored and their potential use for addressing urban-rural co-prosperity discussed.

Biography: Senior Associate Dean of Agricultural Research and Graduate Education, Professor Agricultural & Biological Engineering, Purdue University. He is recognized as a leading international researcher in hydrologic/water quality modeling and environmental decision support tools. His research and teaching are focused on hydrologic/water quality models, their applications, and supporting technologies such as GIS and remote sensing that leverage the application and utility of these models. He has worked and continues to work with various hydrologic/water quality models including SWAT, L-THIA, APEX, GLEAMS, NAPRA, WEPP, ANSWERS, and AGNPS among others. His research efforts have provided improvements to these and other models as well as used them to address important scientific and policy questions. In his more than 33 years of experience working in these areas, he has published more than 300 peer reviewed journal articles on hydrologic/water quality models and their applications. Recognitions include American Society of Agricultural and Biological Engineers (ASABE) Outstanding Young Researcher Award, Outstanding Graduate Educator (Purdue University), Food Systems Leadership Institute Fellow, ASABE Fellow, ASABE Gilley Academic Leadership Award, ASABE ADS/Hancor Soil and Water Conservation Engineering Award.

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Pao Srean, Ph.D.

Dean of the Faculty of Agriculture and Food Processing , National University of Battambang – Battambang

Country: Cambodia

Title: “Beneficial utilization and economic values of wild food plants in northwestern Cambodia”

Abstract: Underexploited vegetable crops or wild food plants (WFP) have high potential to contribute to nutritional and/or medicinal health, generating income and sustaining the environment. Two hundred seventy-five (275) retailers in Battambang and Siem Reap were interviewed, to collect data on wild food plant species availability selling at the markets. Thirty-four (34) plant species were identified as WFP species, including annual and perennial herbs; perennial shrubs, vines and trees. Leave, shoots, stems, rhizomes, corms, flowers and fruits were the part use of the plant for cooked dishes. Most of the part use (92.4%) were collected from wild, 7.6% were reported as cultivated. The plant species are high in vitamin A, C, a good source of minerals, and can be used as traditional medicine. to enhance health and alleviate the ‘hidden hunger’ of micronutrient malnutrition by promoting the production and dietary incorporation of wild food plants rich in minerals and vitamins.

Biography: Pao Srean is a Dean of the Faculty of Agriculture and Food Processing at the National University of Battambang, Cambodia. His research has focused on on-farm research in upland and lowland cropping systems in Cambodia. His current work emphasises the importance of reduced tillage, conservation of crop residues, and sustainable intensification and diversification of rice; and strengthening informal seed systems, conserving and promoting neglected and underutilized species, and approaches to sustainable intensification of smallholder farming systems in Cambodia. More information at <https://paosrean.wordpress.com>.

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Johana Husserl, Ph.D.

Associate Professor, School of Civil and Environmental Engineering, University of the Andes – Bogotá

Country: Colombia

Title: “Using Wastewater as The Sole Source of Energy in Rural Communities: Some Challenges and Questions That Still Need to Be Addressed”

Abstract: Inadequate sanitation and water contamination are prevalent problems in developing countries. Also, many rural communities living in developing countries lack access to electricity. Anaerobic treatment of waste, including wastewater, can result in methane production, which can later be burned to produce electricity. However, methane yields can be low and maintaining anaerobic treatments in rural communities is somehow challenging. Here we evaluate the use anaerobic wastewater treatments coupled to microalgae bioreactors as a means for producing electricity in rural communities. We present some of the limitations and challenges associated with the use of microalgae as part of the proposed system.

Biography: Johana Husserl is an Environmental Engineer (Tulane University, 2002), with a M.S. in Environmental Engineering (Tulane University, 2003) and a Ph.D. in Environmental Engineering (Georgia Institute of Technology, 2011). She is an Associate Professor at University of the Andes in Bogota-Colombia, where she started teaching 10 years ago. She teaches classes in Wastewater Treatment, Environmental Chemistry, Chemical and Microbial Risk Assessment, and Soil and Site Remediation. Her research areas include environmental microbiology, quantitative microbial risk assessment, biomaterials, soil and site remediation, and production of microbial products with environmental applications. She has also investigated antibiotic resistance in wastewater and natural water systems. Wastewater treatment is often considered a costly process and right now has a very large carbon footprint. However, Johana’s research has

also focused on obtaining bioproducts or energy from wastewater, aiming to reduce the carbon footprint of the process.

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Shanshan Li, Ph.D.

Researcher, Institute of Finance and Economics, Central University of Finance and Economics – Beijing

Country: China

Title: “The Spatial Logic of Regional policy on the Development of Special Economic Zones in China”

Abstract: Place-based policy has been pursued by many governments around the world since 1950s. Special economic zones are one of important instrument of place-based policy. They aim at fostering economic growth in a specific area within a larger jurisdiction. In China, spatial economic zones (SEZs) play an important role in promoting economic development and accelerating the process of urbanization, but the perspective of spatial logic is ignored by popular research. This presentation internalizes the goal-setting and development dynamics to divide the development of SEZs into five stages. SEZs as an instrument of spatial policy to break the rigid border of administrative divisions of cities, expanding the urban governance scope and the economic impacts of urban system on rural system.

Biography: Shanshan Li is an assistant researcher in the Institute of Finance and Economics, Central University of Finance and Economics, Beijing, China. She received a doctoral degree in regional economics from Renmin University of China. She is a distinguished researcher of Finance and Economics Research Base of Beijing Philosophy and Social Sciences, a committee member of International Association of Regional Sciences and Chinese Society of Urban Economics. She has published more than 20 research papers and authored one professional book. She led a project funded by Beijing Social Science Foundation and participated in a major

project funded by National Social Science Foundation and more than ten projects of National Natural Science Foundation. She led some planning projects that included local five-year plan for national economic and social development, urban development strategy planning, industry planning. And participated research projects of National Development and Reform Commission, China Research Institute of Environmental Science, and China Urban Planning and Design Research Institute.

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Robert Spajić, PhD, Ag. Eng.

Professional Associate, Faculty of Agrobiotechnical Sciences, University of Osijek – Osije, Croatia. Adjunct Professor, Department of Biosystems Engineering and Soil Science, University of Tennessee, Institute of Agriculture – Knoxville, Tennessee

Country: Croatia

Title: “By-products of Agricultural Industry”

Abstract: Agricultural Industry By-Products become more and more an issue in a modern world of agricultural industry. Majority of the agricultural industry by-products were considered as a dangerous waste through the decades. With an aim to control, managing and use agricultural industry by-products on environmentally acceptable way, there is lot of biotechnical solutions on how to introduce new steps in the mentioned sector and get positive effects in these processes. Significant portion of the “waste materials” from the agricultural industry should be considered as by-products and called raw materials for further positive usage purposes and products; such as energy, organic fertilizer, etc. Different models of agricultural industry by-products management solutions and usage models will be shown through the presentation. How to reduce pressure to environment and turn the problematic materials (such as manure, slaughter house waste, sugar industry waste, brewery waste) into usable raw materials is one of the main considerations today.

Biography: Dr. Spajić is presently employed at Department for Agricultural Techniques and Renewable Energy Sources under the Faculty of Agrobiotechnical Sciences Osijek. Prior to his employment at the University he was employed as a Director of Swine Production within the Agrokor Company in Croatia. His work within the Agrokor Company was focused on developing large commercial swine production systems in Croatia, including introduction of waste management solutions on a large-scale livestock farm operation, followed by development of biogas plant technical solutions. In period from 2004 – 2007, Dr. Spajić worked for Development Alternatives Inc. (DAI) for four years as an extension agricultural consultant on US Embassy-USAID agricultural development projects in Croatia. From 2000 – 2004, Dr. Spajić was employed on several large-scale dairy and beef operation and led the development of several large-scale dairy operations in Croatia. In period from 2008 – 2009 he was a Fulbright Scholar as a Scientist on Iowa State University, pursuing his doctorate degree in Biotechnical Science and Ag. Engineering, focusing on Waste management, fermentation processes and Biogas plant Engineering. He holds Ph.D. in Biotechnical Science and Agricultural Engineering, from University of J. J. Strossmayer Osijek in Croatia. Mr. Spajić also served as an external adviser to the Ministry of Agriculture of Croatia in process of adjusting Croatian agricultural laws to meet European Union Standards as Croatia prepares to seek membership in the European Union. Mr. Spajic has worked on projects in Croatia, USA, Germany, Finland, Russia, Ukraine, Czech, Serbia and Italy. He is a member of ASABE Association – American Society of Agricultural and Biological Engineers and member of Fulbright Alumni. He is also a member of Croatian Agricultural Society and Croatian Association of Court Entrepreneurs. In more than 20 years of work experience, he published more than 50 scientific papers and conduct numerous public presentation's focused on livestock and agricultural industry waste management issues. From 2015 Dr. Spajić is a member of Board of Directors at International Research Center for Animal Environment and Welfare in China. Presently he is a Member of European Commission Technical Working Group for IPPC/IED Directive implementation in two sectors – Food Drink and Milk Sector and Intensive Rearing of Pigs and Poultry Sector.

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Liem Tran, Ph.D.

Professor, Department of Geography, University of Tennessee – Knoxville, Tennessee

Country: United States of America

Title: “Determine Ecosystem Health Disparities in the context of urban-rural gradient”

Abstract: Urban regions are concentrations of sociopolitical power and prime architects of ecosystem service demands such as land transformation or serving as consumption hubs of water. At the same time, urban regions are the primary source of various environmental impacts. For instance, infrastructures in urban regions extend well outside metropolitan boundaries and impact ecosystems in surrounding rural areas (e.g., water pollution, biodiversity loss). However, tradeoffs between the supply/demand of ecosystem services and impact on ecosystems and their services in the urban-rural gradient context have rarely been explored systematically. In that context, we utilized a comprehensive model to quantify the roles of anthropogenic stressors on hydrologic alteration and biodiversity in US streams and isolate the impacts stemming from hard infrastructure developments in cities. We will expand the model to calculate the supply and demand of essential provisioning ecosystem services (e.g., food, water, and energy) and key environmental impacts (e.g., water pollution, air pollution) along the urban-rural gradient in Tennessee.

Biography: Tran is an environmental geographer and GIS/geospatial analyst. His primary research interests include integrated regional vulnerability assessment, the use of artificial intelligence (e.g., fuzzy set theory, neural network, and cellular automata) in geographic analysis and modeling.

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Workshop 3 Chairs:

Dr. Jamie Greig, Dr. Andrea Hicks, Dr. David Ader



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Workshop 4: Sustainable Economies and Society

Invited Speakers' Abstracts and Biographies

Tuesday, November 16, 2021



Felix Ekardt, Ph.D.

Director of the Research Unit Sustainability and Climate Policy – Leipzig. Professor for Public Law and Legal Philosophy, Rostock University – Rostock

Country: Germany

Title: “Climate Protection – Urban or Transnational Level?”

Abstract: The 1.5 degree limit in the Paris Climate Agreement requires zero emissions worldwide in the near future, i.e. also zero fossil fuels in all sectors and greatly reduced livestock farming. The lecture discusses how the interaction of the necessary measures between the

municipal level on the one hand and the national, continental and international level on the other hand can work.

Biography: Felix Ekardt is Director of the Research Unit Sustainability and Climate Policy in Leipzig which he founded in 2009. Since 2009, he is also Professor for Public Law and Legal Philosophy at the Rostock University (Faculty of Law) as well as member of the Leibniz Science Campus on Phosphorus Research – as well as member of the Interdisciplinary Faculty (Department Knowledge-Culture-Transformation). His scientific focus as a lawyer, philosopher and sociologist lies in issues around human science sustainability studies. More specifically issues of transformation and social learning processes, justice (particularly human rights), governance and law (sustainability law/ environmental law and sustainability politics/ environmental politics in terms of developing policy instruments on international, European, national and regional level).

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Lixiao Zhang, Ph.D.

Professor and deputy dean of School of Environment, Beijing Normal University – Beijing

Country: China

Title: “Urban Food-Energy-Water Nexus: Dynamics and Optimization“

Abstract: With increasing urbanization but growing resource scarcities, the effective provision of essential resources as food, energy and water (FEW) has become a unique challenge for urban sustainability. However, most of existing studies focus on the qualitative discussion of existing linkages and quantitative changes in specific nexus problems. It is imperative to build a better understanding of the dynamics and optimization management of urban FEW systems. Using the STELLA platform, a system dynamics model named the BJ-FEW was developed by incorporating both the production and consumption sides of FEW systems into a single system-of-system model that considered the interactions between the FEW sectors within and beyond

the city. This model was run for the megacity of Beijing over the period from 2000 to 2050 to simulate changes in the FEW demand and supply. Results showed that Beijing City will face an increasing challenge of FEW resource securities with regard to the enlarging gap between the total demands and the local provision capability. Under the baseline scenario, the total demand for food, energy, and water in Beijing will reach 10 Mt, 129 Mtce, and 6.4 Bm³, respectively, in 2050. Additionally, it was estimated that approximately 75% of food, 88% of energy, and 48% of water will depend on trans-boundary imports. Besides, a systematic and integrated optimization framework was established to quantify the saving potential of FEW consumptions and to identify the optimal path for urban sustainable development. We identified that the amount of FEW consumptions could decrease by 10%. The scenario analysis indicated that the adjustments in production-consumption patterns, urban planning and regional coordinated management would contribute to promote urban sustainability.

Biography: Lixiao Zhang is a professor and deputy dean of School of Environment, Beijing Normal University (BNU), China. He obtained his Master degree and Ph.D. degree in environmental sciences from Peking University. Prior to joining BNU in 2005, he was a research fellow in BOKU university of Austria. Zhang has been involved in research on various aspects of environmental accounting and modeling, with special focus on renewable energy systems, food-energy-water nexus, and urban metabolism since 2007. Over this time, he has conducted research on life cycle assessment (LCA), Environmental Input-Output Analysis (EIOA), and Ecological Modelling techniques. He is also recognized for his productive and most highly cited scholarly output in environmental accounting and management. He has authored over 150 peer-reviewed papers and 5 books. His research work is widely recognized and has more than 3000 citations with H-index of 30 according to Web of Science. He has served as the General Secretary of Environmental Geoscience Branch of Chinese Society for Environmental Sciences. He is the Co-Editor-in-Chief of Journal of Environmental Management (IF 5.6), and has served as principal investigator for more than 20 large-scale research projects.

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Ziqian (Cecilia) Dong, Ph.D.

Professor, Electrical and Computer Engineering, College of Engineering and Computing Sciences, New York Institute of Technology – Westbury, New York

Country: United States of America

Title: “Blockchain and Carbon Footprint Tracking of The Food Supply Chain”

Abstract: Growing population and increasing food demand have had a great impact on the environment and the climate. Efforts have been made to reduce carbon footprint in many recent studies. Calculating the carbon footprint of food products is complex and requires the cooperation of all the stakeholders of the food supply chain. This study presents a new implementation of Blockchain for tracking of carbon footprint on food production and transportation stages. We designed the carbon footprint chain system that uses cluster-based distributed record keepingsystem to provide the food processing facilities and transportation parties to share carbon footprint of food without compromising their privacy. We implemented the proposed carbon footprint chain and evaluated its throughput and latency under different scenarios. We show that our Blockchain implementation is scalable and can operate with a larger number of nodes.

Biography: Ziqian (Cecilia) Dong is a Professor in the Department of Electrical and Computer Engineering at New York Institute of Technology (New York Tech). She received her B.S. degree in Electrical Engineering from Beijing University of Aeronautics and Astronautics, Beijing, China, M.S. in Electrical Engineering and Ph.D. in Electrical Engineering from New Jersey Institute of Technology (NJIT), Newark, NJ. She was awarded the Hashimoto Prize for the best Ph.D. dissertation in Electrical Engineering, NJIT. She is the recipient of 2006 and 2007 Hashimoto Fellowship for outstanding scholarship and the New Jersey Inventors Hall of Fame Graduate Student Award for her inventions in network switches. She received the New York Institute of Technology Presidential Award in Student Engagement in Research and Scholarship in 2015, Innovate Long Island’s Fifth Annual Innovator of the Year Award in 2020, and the American Society of Engineering Education (ASEE) Engineering Research Council 2020 Curtis W. McGraw Research Award in non-PhD program for research accomplishments and innovation. Her research interests include communication networks, network security and forensics, wireless sensor networks, assistive medical devices, and data analytics and innovative sensing technology to improve sustainability and resilience of both natural and built environment. Her research is funded by the U.S. National Science Foundation, Northrop Grumman, Motorola, Xilinx, Venturewell, and New York Tech. Her current research projects are interdisciplinary including the development of an autonomous soil nutrient sensing system to help with precision agriculture while reducing environmental impact and international collaborative project on the development of decision support visualization models and tools to understand the interconnection among food, energy, and water and their infrastructure in an urban environment. She is the principal investigator of a five-year NSF INFEWS grant to establish a research coordination network that use “City-as-lab” concept to study Food, Energy, and Water Nexus for a sustainable urban environment. She is a senior member of IEEE, a member of IEEE Communication Society and Women in Engineering, American Society for Engineering Education (ASEE), ACM, and the Environmental Sensing, Networking and Decision-Making (ESND) technical committee. She served as the general co-chair of the Food,

Energy, and Water Nexus Conference 2019, the Networking Networking N²Women Workshop 2019, and the 37th IEEE Sarnoff Symposium 2016. She has served in technical program committee of IEEE HPSR, IEEE Sarnoff, IEEE ICC, GLOBECOM, GreenCom and ChinaCom, and as a reviewer for IEEE journals, conferences and NSF panels.

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Yuang Chang, Ph.D.

Professor, School of Management Science and Engineering, Central University of Finance and Economics – Beijing

Country: China

Title: “Quantifying the GHG mitigation potential of urban roadway lighting in China”

Abstract: Roadway lighting is critical for creating safe environments for drivers and pedestrians. As China continues to urbanize, the increase in the number of street light facilities will exacerbate the energy and environmental burdens of urban areas. Adopting energy-efficient lighting luminaires and using renewable energy can improve the greenhouse gas (GHG) mitigation potential of urban roadway lighting, contributing to the development of a low-carbon urban environment. In this study, we used a bottom-up approach to estimate GHG mitigation potential associated with replacing current high-pressure sodium (HPS) lamps with light-emitting diode (LED) lamps and deploying solar and/or wind street lights in 662 cities in China. The results showed that the LED-HPS lamp replacement and renewable energy utilization can annually reduce GHG emissions by 21.2 million tons (Mt) of CO₂e, which is dominated by branch (38%) and trunk roads (31%). East China, especially Jiangsu and Shandong provinces, has the largest GHG mitigation potentials. Dalian, Shanghai, and Tianjin are among the top cities with the greatest GHG mitigation potential. For cities with different administrative levels, prefecture-level cities can achieve a GHG mitigation potential of 56%, approximately 11.9 Mt CO₂e/year.

Biography: Yuan Chang is a professor at School of Management Science and Engineering, Central University of Finance and Economics (CUFE), Beijing, China. He received a PhD in Management Science and Engineering from Harbin Institute of Technology and a PhD in Design, Construction and Planning from the University of Florida. Prior to joining the CUFE in 2014, he worked as a postdoctoral researcher at the Northwestern University. Chang integrates interdisciplinary approaches from the fields of industrial ecology, sustainable engineering, as well as economic and management sciences to promote more sustainable engineering practices and policies. Specially, his research interests include sustainable building and infrastructure systems, environmental policy management, and economic-environmental-social assessment. He has authored over 50 peer-reviewed journal papers, and served as principal investigator or investigator for more than 10 research projects. He is also an Associate Editor of the Journal of Environmental Management, as well as an Accredited Professional of Leadership in Energy and Environmental Design (LEED AP) issued by U.S. Green Building Council.

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Keith Kline

Distinguished Research Scientist, Oak Ridge National Laboratory – Oak Ridge, Tennessee

Country: United States of America

Title: “Opportunities for standards to support more sustainable urban systems: Circular Economy Standards in development with the International Organization for Standardization”

Abstract: This presentation provides an overview of the scope and current status of ISO standards development activity on circular economy:

- ISO 59004 Framework and principles for implementation (including terms and definitions);
- ISO 59010 Guidelines on business models and value chains;

- ISO 59020 Measuring and Assessing Circularity;
- ISO 59040 Circularity Product Data Sheet; and ISO TR 59032 Review of business model implementation.

Related standards, complementary methods, and some of the issues the ISO Technical Committee (TC 323) has grappled with in the process thus far, will be noted. Trends and advantageous conditions for urban areas to contribute to more sustainable circular economies will be highlighted. The presentation is based on Keith's contributions to the ISO Standards as a member of the US Technical Advisory Group to the International Organization for Standardization/ISO TC 323 Circular Economy. Additionally, the role and activities of the national Technical Advisory Groups will be described, along with information on how people can join and engage in the standards drafting process.

Biography: Keith L. Kline, a Distinguished Research Scientist, Oak Ridge National Laboratory, assesses renewable energy options to identify approaches that support beneficial land management. Keith spent 24 years in developing nations supporting community forest management, biodiversity conservation, and SDGs. Since 2008, Keith has led research and authored 90 publications on bioenergy, natural resource management, and sustainable development. Keith supports the ISO Technical Committee 323 on Circular Economy and the International Research Network on the nexus of Food-Energy-Water. For more info, see the [Climate Change Science Institute](#) and [Center for Bioenergy Sustainability](#).

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José G. Vargas-Hernández, Ph.D.

Research Professor, Technological Institute of Zapopan – Zapopan, Jalisco

Country: Mexico

Title: “Urban Spaces and Public Sphere: Institutional Design of Democratic Decentralization“

Abstract: The purpose of this paper is to conduct a critical analysis based on the institutional design of the democratic processes of the public sphere and urban spaces in the empowerment of local governments. The approach is a theoretical construction after reviewing some important developments in the issues of the roles of the state, economy, civil society and the media on the decentralization processes of empowerment of local governments in their public spheres and urban spaces. This critical analysis is sustained on the political ideology, macro institutional design, political leadership and authority, developed by the New Left's theoretical approach. With this critical analysis, it is intended to further develop the ongoing debate on democratic decentralization and the implications of the roles of the state, economy, civil society and the media on the public sphere and urban spaces in the empowerment of local governments.

Biography: Research professor at Tecnológico MM Unidad Zapopan, formerly at University Center for Economic and Managerial Sciences, University of Guadalajara. Member of the National System of Researchers of Mexico. Professor Vargas-Hernández has a Ph. D. in Public Administration and a Ph.D. in Organizational Economics. He has been visiting scholar at Carleton University Canada, University of California Berkeley and Laurentian University, Canada. He holds a Ph.D. in Economic, Keele University; Ph.D. in Public Administration, Columbia University; studies in Organizational Behavior at Lancaster University and has a Master of Business Administration; published nine books and more than 300 papers in international journals and reviews (some translated to English, French, German, Portuguese, Farsi, Chinese, etc.) and more than 300 essays in national journals and reviews. He has obtained several international Awards and recognitions. He has also experience in consultancy. His main research is in organizational economics and strategic management. He teaches for several doctoral programs.

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Daohan Huang, Ph.D.

Researcher, Beijing University of Civil Engineering and Architecture – Beijing

Country: China

Title: “Urban Water-Energy Nexus: Evidence from Water Evaluation And Planning Model”

Abstract: Water and energy are intertwined in varied scales. In the mega city scale, the amount of energy consumption in urban water supply system is relatively small, but using unconventional water sources to address water scarcity issue increases local energy consumption, especially in the water scare mega city like Beijing. However, the local nexus evidence in using unconventional water sources is largely ignored. With water evaluation and planning (WEAP) system, the WEAP Beijing model is developed to explore nexus evidence in Beijing water supply system via scenario analysis. Results show that the total energy consumption in Beijing water supply keeps rising since 2001. While the average energy intensity is increasing between 2001 and 2014, and it is varying since 2015. The transferred south water since 2008 totally consumes 3.946 billion kWh, while the groundwater storage and reservoir storage increase 5 billion and 0.677 billion cubic meter, respectively. Furthermore, the structure of water sources by demand node is also estimated in WEAP, Beijing model.

Biography: Daohan Huang is from Beijing University of Civil Engineering and Architecture (BUCEA), Beijing, China. He focuses on water-energy-food nexus (WEF nexus) at the urban level, and Beijing is his focal area at WEF nexus modeling and governing. He has published a series of papers at WEF nexus issues, builds the WEAP_Beijing model to explore water-energy nexus, and holds WEF nexus projects funded by NSFC (2021) and BUCEA (2020). Daohan earned his Ph.D. in Economics from Central University of Finance and Economics in 2019, and he worked as an intern at the water group of Stockholm Environment Institute-US center in 2018, aiming to build the WEAP_Beijing model.

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Jennifer Givens, Ph.D.

Assistant Professor, Utah State University – Logan, Utah

Country: United States of America

Title: “Focusing on FEW managers, stakeholders and academics: Results from FEW focus group research”

Abstract: Food-Energy-Water systems are inextricably linked, however, managers of food, energy, and water systems are often working on specific tasks and goals that pertain to one of the sectors. We conducted focus groups with food, energy, and water managers and stakeholders, in addition to a group of academics studying system resilience and sustainability, in the Columbia River Basin. We were interested in looking for connections across sectors, and exploring what is emphasized compared to what may be left out. Our results suggest perspectives to consider when moving forward in system sustainability research, policy development, and planning.

Biography: Jennifer Givens is an assistant professor at Utah State University, Logan, USA. As an environmental and comparative international sociologist, she studies coupled human and natural systems. Her research examines environmental quality and social well-being and equity at various scales, and she studies how these relationships change over time. Her current interdisciplinary research explores resilience and sustainability in food, energy, and water systems, and the complexities of incorporating both social and biophysical aspects into models. In other research she investigates variation in countries’ carbon intensity of well-being, which is a way to measure a country’s progress toward simultaneous environmental sustainability and equitable social well-being by asking how carbon intensely nation-states produce well-being for citizens. This research explores the effects of unequal global integration and militarization, addresses issues of inequality, human well-being, sustainability, and energy use, and explores the connections between development and drivers of climate change. This research is quantitative, and she employs both longitudinal and multilevel modeling techniques. In a third area of research, she explores various forms of environmental concern and action and their causes and consequences, both across and within nations.

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Sheryll Durant

Urban farmer, Educator and Food Justice Advocate – Bronx, New York

Country: United States of America

Title: “Food is the gateway to all things justice”

Abstract: Kelly Street Garden’s focus is to use food as the entry point to healing a community. The garden functions as a vehicle for addressing generational trauma which has caused many health disparities resulting from systemic racism. Through a multi-tiered programming structure, they bring nutrition, art, herbal medicine and community engagement to our South Bronx neighborhoods. Food is the gateway to all things of justice.

Biography: Sheryll Durrant is an urban farmer, educator, and food justice advocate. She has been the Resident Garden Manager at [Kelly Street Garden](#) since 2016, and is also the Food and Nutrition Coordinator for New Roots Community Farm, managed by International Rescue Committee (IRC). She currently serves as Board President for [Just Food](#). Prior to her work in urban agriculture, Sheryll spent over 20 years in corporate and institutional marketing.

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Wednesday, November 17, 2021



Jose A. Puppim de Oliveira, Ph.D.

Faculty, Getulio Vargas Foundation – Rio de Janeiro. Visiting Chair Professor at the Institute for Global Public Policy, Fudan University – Shanghai

Country: Brazil

Title: “Urbanization, Climate Change and the Sustainable Development Goals”

Abstract: Is urbanization a wicked problem or a solution to climate change? The role of cities for achieving the Sustainable Development Goals (SDGs) has become increasingly apparent as the world keeps urbanizing. Cities consume huge amounts of water, energy, food and other resources and discharge large amounts of greenhouse gases (GHGs); but, cities also present great opportunities for leading us towards a sustainable future. Cities are centers of knowledge, technological innovation, financial resources, and decision making that can catalyze changes quickly. This talk will present the opportunities and challenges for tackling climate change and achieving the SDGs by looking at the trends in urbanization, its relation to climate change and the emerging solutions from cities around the world, as well as the research challenges and opportunities in the field of global climate change and sustainability.

Biography: Jose A. Puppim de Oliveira is a faculty member at FGV (Fundação Getulio Vargas) in Brazil with extensive experience in managing research programs, organizations and transdisciplinary projects. He is also Visiting Chair Professor at the Institute for Global Public Policy (IGPP), Fudan University (Shanghai). His research and policy interests concentrate in patterns of governance, institution building and policy implementation at different levels, looking at how global environmental change and national institutions are interlinked to steer governance and local action. His experience comprises research, consultancy and policy work in more than 20 countries in all continents. He held positions of Senior Research Fellow and Assistant Director of UN University Institute of Advanced Studies (UNU-IAS) in Japan between 2009 and 2015. Previously, he worked as faculty member at the University College London (UK), where he co-directed the MSc in Environment and Sustainable Development, and the University of Santiago de Compostela (Spain) as a Marie Curie Fellow. He has published several books and more than 100 articles in peer-reviewed journals, which fed in policy processes such as IPCC and governmental and UN discussions. He is editor-in-chief of the journal Public Administration and Development (PAD, Wiley) and member of several editorial boards. He has a PhD in Planning from the Massachusetts Institute of Technology (MIT).

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Bruce Tonn, Ph.D.

President of Three³, Inc. – Knoxville, Tennessee

Country: United States of America

Title: “Sustainable and Affordable Household-Level Self-Sufficiency Enabled by Integrated Abundance Advances”

Abstract: A future is imagined where economically disadvantaged households are empowered to achieve economic self-sufficiency through the employment of affordable and integrated abundance advances. Millions of American households struggle to make ends meet, due in part to a lack of living wage jobs and growing dependence of elders on Social Security as their only source of income. It is anticipated that continued automation of the American economy will displace a large percentage of the workforce in the coming decades. The COVID-19 pandemic forcefully showed that low-income households severely lack financial savings and are not economically self-sufficient in the strongest sense. They do not have the ability to produce much if any of their own electricity or food, for example. How abundance advances can be integrated and employed at the household-level to achieve economic self-sufficiency will be discussed. Policies to facilitate and accelerate the transition to strong self-sufficiency will also be addressed..

Biography: Bruce Tonn is president of Three³, Inc., a 501 c3 non-profit organization located in Knoxville, Tennessee. His research on the health benefits of weatherizing low-income homes and affordable multifamily buildings cross-cuts the fields of public health, energy efficiency, and climate change by demonstrating how weatherization can reduce heat-related thermal stress medical interventions and death. He has authored/co-authored over 300 publications. Recently, his book titled *Anticipation, Sustainability, Futures and Human Extinction: Ensuring Humanity’s Journey into the Distant Future* was released by Routledge Press. He is a former Senior Researcher of the Environmental Sciences Division of Oak Ridge National Laboratory and holds the position of Professor Emeritus at the University of Tennessee-Knoxville. He has degrees from Stanford University (B.S. Civil Engineering), Harvard University (Masters in City and Regional Planning), and Northwestern University (Ph.D. in Urban and Regional Planning).

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Xiaoyu Liu

Senior Program Officer, Energy Transition to 100% Renewable. World Wide Fund for Nature (WWF) – Beijing

Country: China

Title: “Urban Carbon Emission Reduction – Low Carbon School Project”

Abstract: In August 2019, WWF carried out the lighting and air-conditioning equipment low-carbon upgrades in Xinglong Middle School in Zhenjiang City, Jiangsu Province in China. Based on the international leading standard, this project was aiming at playing the demonstration and pilot role for the local school lighting and air-conditioning system upgrade, to provide data support for the development of local standards for low-carbon schools. As an excellent case to tell China’s low-carbon transition story, this project has been presented to the international community at COP25. In January 2021, Zhenjiang City released Low-carbon School Construction Guidance as an official municipal local standard. This is not only the practical achievement of the Zhenjiang City’s green development, but also the first complete campus construction standards in Jiangsu province. According to government official press, Zhenjiang is planning to carry out energy-saving lighting and lighting renovations in 50 schools in the city in 2021.

Biography: Xiaoyu Liu is the Senior Program Officer of Energy Transition to 100% Renewable Department at WWF China. She has spent over 6 years on sustainable development project coordination and promotion. Her current responsibility at WWF China included energy transition at the sub-national level, and the application and promotion of high proportion of renewable energy in buildings, transportation, and other sectors. Prior to WWF, she worked successively in China Network Television, and Ministry of Science and Technology (MoST) The Administrative Center for China’s Agenda 21 (ACCA21). As the project coordinator of China, she participated in the management of the United Nations Development Program (UNDP) “China-Ghana/Zambia Renewable Energy Technology Transfer” project, which won the Second Prize of Science and Technology Progress of China Renewable Energy Society. She supported ACCA21 along with UNDP to initiate the “Technology Transfer South-South Cooperation Center”. She is one of the

co-authors of *Exploration of Renewable Energy Technology Transfer Model in South-South Cooperation* (Science Press, 2020). Several decision-making consultation reports that she participated in were adopted by government departments.

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Chris Pianta

Environmental Program Manager, Tennessee Department of Environment and Conservation – Nashville, Tennessee

Country: United States of America

Title: “A State Agency Perspective: The Role of TDEC’s Office of Policy and Sustainable Practices in Tennessee”

Abstract: The Tennessee Department of Environment and Conservation’s (TDEC) Office of Policy and Sustainable Practices (OPSP) plays an important role in ensuring that TDEC fulfills its mission and vision through a two-pronged structure: environmental policy and sustainability programs. On the policy side, OPSP works collaboratively with TDEC leadership and technical experts, the Governor’s Office, federal agencies, state agencies, communities, and other stakeholders to identify proposed environmental policy projects and changes of importance to Tennessee. On the sustainability side, OPSP administers a number of educational, technical assistance, networking, and recognition programs which support building sustainability and resilience in three stakeholder areas: Communities, Businesses, and Institutions & State Government. In this session, we will discuss OPSP’s roles and how OPSP supports environmental sustainability and resilience in Tennessee.

Biography: Christopher Pianta is an Environmental Program Manager for the Office of Policy and Sustainable Practices. He has a Bachelor of Science in Environmental Science from the University of Tennessee, and a Masters in Environmental Engineering from Vanderbilt

University. Chris spent the early part of his career in consulting, working mostly on solid waste and remediation projects. Since transitioning to his current career with the State, Chris has developed both an expertise and a passion for sustainability, particularly in the field of waste reduction and energy efficiency. He is one of the Office's Team Leads and is responsible for managing several programs that focus on assisting State entities to improve their triple bottom line through implementation of sustainable practices.

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Todd Lawrence

Director for Urban Green – Nashville, Tennessee

Country: United States of America

Title: “The Nashville Food Waste Initiative”

Abstract: The Nashville Food Waste Initiative (NFWI) works to grow policies and strategies for reducing wasted food at the city level through rescuing surplus food for those in need, recycling and composting food scraps, and preventing food waste. Started in 2015 by the Natural Resources Defense Council, and led by Urban Green Lab in partnership with the Environmental Law Institute, the NFWI is proving cities in the heartland of the U.S. can make great strides toward achieving national goals.

Biography: Todd Lawrence is executive director for Urban Green Lab in Nashville, Tennessee, which teaches communities how to live sustainably. A Nashville native, Todd spent most of his career in global public health and communication education prior to his career in environmental sustainability. He has a masters in International Development from American University.

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Jennifer Jurado, Ph.D.

Chief Resilience Officer and Deputy Director, Environmental Protection and Growth Management Department, Broward County – Broward, Florida

Country: United States of America

Title: “Advancing Community Resilience through Regional and Private Sector Collaboration”

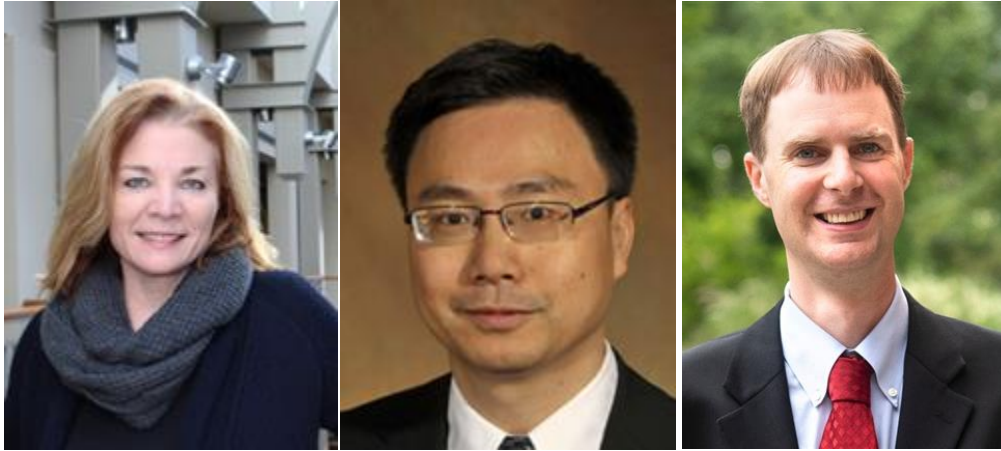
Abstract: The Southeast Florida Regional Climate Change Compact was established in 2010 as a voluntary collaboration among four counties (Broward, Miami Dade, Palm Beach and Monroe) to partner in meeting the shared challenges of climate change. The Compact collaboration has led to the joint creation of planning tools, capacity building workshops, a regional climate action plan, and delivery of annual Climate Leadership Summits. More recently, engagement with the private sector has brought a new dimension to the Compact’s efforts, with a joint advocacy and focus on risk reduction and economic considerations extending to credit rating, insurance and finance. In Broward County, the engagement of business leadership has contributed to the successful adoption of resilient building standards, land use planning criteria, and funding to produce a community-wide risk assessment and infrastructure improvement plan.

Biography: Jennifer Jurado is responsible for leading climate resilience and environmental planning initiatives for Broward County, FL with a focus on urban adaptation, sustainable resource management, and clean energy strategies. For nearly two decades she has guided the integration of science to inform resilient design standards and has led multi-jurisdictional initiatives involving public-private partnerships key to large-scale initiatives. She is an original contributor to the Southeast Florida Regional Climate Change Compact and serves on the board with the American Society of Adaptation Professionals and the American Geophysical Union’s Thriving Earth Exchange.

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Workshop 4 Chairs:

Dr. Wendy Tate, Dr. Mingzhou (Ming) Jin, Dr. Tom Gill



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