



Sustainable Energy for a Sustainable Future

An ASABE Global Initiative Conference



October 24-27, 2022
University of Costa Rica, San Jose, Costa Rica

Conference link: <https://energy.asabe.org/>
Conference apps: https://whova.com/portal/webapp/sesf_202207/

PROGRAM

(Subject to Change)

MONDAY, OCTOBER 24

08:00-17:30 Registration and Booth Setup – Salon Multiuso, Plaza de la Autonomia, UCR

08:30-09:00 Conference Inauguration

Moderator: Mr. Jose

Comments by Keith G. Tinsey, P.E., ASABE President

Comments from US Embassy in Costa Rica

Comments by Rector Gustavo Gutierrez Espeleta, University of Costa Rica

09:00-09:50 Keynote Address

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator: Dr. Wei Liao

Keynote Speakers:

Dr. Peter Vadas, National Program Leader, USDA Agricultural Research Service (ARS), USA

Dr. Bruce Dale, Distinguished professor, Michigan State University, USA

09:50-10:00 Break

Monday, October 24 – 10:00-12:15

TECHNICAL SESSION I: AGRICULTURE AND THE CIRCULAR BIOECONOMY IN SUSTAINABLE ENERGY PRODUCTION-1

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Jian Shi and Dr. Mauricio Bustamante

Time	Title, Author, Institution, Country
10:00-10:15	The ASABE circular bioeconomy systems initiative toward advancing for a sustainable future Brahm P. Verma, University of Georgia – USA. Submission ID: 59
10:15-10:30	Performance of self-chilled coolers for preservation of fruits and vegetables under tropical environment Michael Omodara, Nigerian Stored Products Research Institute – Nigeria. Submission ID: 2
10:30-10:45	Case studies of renewable generation on electricity consumption of two Arkansas poultry farms Yi Liang, University of Arkansas – USA. Submission ID: 6
10:45-11:00	Characterization, fractionation and upgrading of endocarp lignin to carbon-silicon nanocomposites as an anode material in lithium-ion batteries

Jian Shi, University of Kentucky – USA. Submission ID: 7

11:00-11:15 Mediterranean by-products and agricultural wastes anaerobic co-digestion for enhancing biogas production within circular economy concept
Francesca Valenti, University of Catania – Italy. Submission ID: 16

11:15-11:30 Design and development of Solar-Agriculture Farm at Dayalbagh Educational Institute
Ajay Kumar Saxena, Dayalbagh Educational Institute – India. Submission ID: 24

11:30-11:45 BREAK

11:45-12:00 Techno-economic analysis and life cycle assessment of pineapple leaves utilization in Costa Rica
Mauricio Bustamante-Román, University of Costa Rica - Costa Rica. Submission ID: 19

12:00-12:15 Integrated system for the revalorization of wet residues from the coffee processing using anaerobic digestion to enhance waste management, increase energy efficiency and improve environmental protection
Juan Pablo Rojas-Sossa, Universidad de Costa Rica – Costa Rica. Submission ID: 21

12:15-12:30 Economic efficiency of the use of microfiltered liquid digestate in Mediterranean crops
Ettore Maria Trimarchi, Università di Catania – Italy. Submission ID: 27

12:30-12:45 Development of engineered bio-chars for nutrient recovery from anaerobic digestion liquid effluents
Sohrab Haghighi Mood, Washington State University – USA. Submission ID: 28

12:45-13:00 BREAK

13:00-14:00 LUNCH

Monday, October 24 – 14:00-15:30

TECHNICAL SESSION I: AGRICULTURE AND THE CIRCULAR BIOECONOMY IN SUSTAINABLE ENERGY PRODUCTION-2

Location: Aula Magna, Plaza de la Autonomía, UCR

Moderator(s): Dr. Zong Liu

Time	Title, Author, Institution, Country
14:00-14:15	Using superstructure optimization to design economically feasible biorefineries based on emerging lignin valorization technologies Juliana Vasco-Correa, Penn State University – USA. Submission ID: 30

14:15-14:30	Anaerobic digestion-based hybrid biorefinery for bioenergy and biomaterials Juliana Vasco-Correa, Penn State University – USA. Submission ID: 36
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14:30-14:45	Open source development of village and small farm integrated, appropriate, renewable energy food-energy-water systems Tom Stanton, National Regulatory Research Institute – USA. Submission ID: 38
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14:45-15:00	Optimization and modeling of microwave irradiated ammonia nitrogen removal from anaerobically digested liquid dairy manure Lide Chen, University of Idaho – USA. Submission ID: 51
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15:00-15:15	Phosphonates removal and recovery from livestock wastewater via modified adsorbents Rubina Altaf, Zhejiang University – China. Submission ID: 44
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15:15-15:30 BREAK

Monday, October 24 – 15:30-17:00

TECHNICAL SESSION I: AGRICULTURE AND THE CIRCULAR BIOECONOMY IN SUSTAINABLE ENERGY PRODUCTION-3

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Hong Liu

Time	Title, Author, Institution, Country
15:30-15:45	Low cost biomethane production in swine farms: A solution for agriculture greenhouse gases emissions Alfonso Garcia, Universidad de Valladolid – Spain. Submission ID: 47
15:45-16:00	Development of acrylated bioresin from soybean oil using green solvents Muthu Muthukumarappan, South Dakota State University – USA. Submission ID: 58
16:00-16:15	Bioeconomy concept for combined biogas and fiber production Benedikt Hülsemann, University Hohenheim – Germany. Submission ID: 54
16:15-16:30	Bioeconomy technologies in agricultural farm of Costa Rica Marco Chaves, Universidad de Costa Rica – Costa Rica. Submission ID: 55
16:30-16:45	Municipal biowaste as feedstock for combined generation of resources and energy through utilization in an innovative biorefinery Marian Baumgart, University of Hohenheim – Germany. Submission ID: 57
16:45-17:00	BREAK

Monday, October 24 – 17:00-18:00

THEMATIC SESSION I: AGRICULTURE AND THE CIRCULAR BIOECONOMY IN SUSTAINABLE ENERGY PRODUCTION

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Mauricio Bustamante

Panelists: Dr. Jian Shi, Dr. Bruce Dale, Dr. Juliana Vasco-Correa, Dr. Brahm P. Verma, Other partners from Industries

Monday, October 24 – 18:00-19:00

STAKEHOLDERS MEETING

Location: Plaza de la Autonomia, UCR

Moderator(s): Dr. Ajit Srivastava

Panelists: ICE, John Deere Co., Qnergy Co., Farmers, Regenis Co., other partners from government agencies and Industries

TUESDAY, OCTOBER 25

Tuesday, October 25 – 08:30-10:00

TECHNICAL SESSION II: DISTRIBUTED RENEWABLE ENERGY SYSTEMS AND GLOBAL CLIMATE CHANGE

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Wei Liao

Time	Title, Author, Institution, Country
08:30-08:45	Ecosystem to reduce carbon emission across the globe Kamalkishore Vora, ARAI – India. Submission ID: 3
08:45-09:00	A decision support system to evaluate the economic feasibility of solar technology on dairy farms Helen Miller, Michigan State University – USA. Submission ID: 11
09:00-09:15	The role of anaerobic digestion and solar PV to achieve carbon neutrality in a farm setting Horacio Aguirre-Villegas, University of Wisconsin-Madison – USA. Submission ID: 14
09:15-09:30	A small-scale, combined electro-chemical process to treat high-strength wastewater for rural communities Gustavo Aburto Vazquez, Michigan State University – USA. Submission ID: 15
09:30-09:45	Anaerobic digester for biogas production in isolated environments with solar energy support Alfonso García, Universidad de Valladolid – Spain. Submission ID: 48
09:45-10:00	BREAK

Tuesday, October 25 – 10:00-11:00

THEMATIC SESSION II: DISTRIBUTED RENEWABLE ENERGY SYSTEMS AND GLOBAL CLIMATE CHANGE

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Wei Liao

Panelists: Mr. Horacio Aguirre-Villegas, Alfonso Garcia, Ajit Srivisatava, Dr. Alfonso Garcia Alvaro, others

11:00-12:00	LUNCH Location: Salon Multiuso, Plaza de la Autonomia, UCR
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Tuesday, October 25 – 12:00-14:00

TECHNICAL SESSION III: SOCIAL, ENVIRONMENTAL, AND ECONOMIC PERSPECTIVES ON ENERGY SECURITY

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Rebecca Larson

Time	Title, Author, Institution, Country
12:00-12:15	Sustainable Development of Rural Economy through the use of “Innovative Bio-energy systems” Rameshwar Kanwar, Iowa State University – USA. Submission ID: 31
12:15-12:30	Educating the next generation on energy for a sustainable society Peter Livingston, California Polytechnic State University - San Luis Obispo – USA. Submission ID: 17

- 12:30-12:45 Social and economic impacts of deaths and injuries in anaerobic digestion systems for energy production in Asia
Ji-Qin Ni, Purdue University – USA. Submission ID: 9
- 12:45-13:00 Mutual learning approach to improve the integration of biodigesters into family farmers' livelihoods in Costa Rica
Juan Pablo Rojas-Sossa, Universidad de Costa Rica – Costa Rica. Submission ID: 32
- 13:00-13:15 Effective anodic sulfide removal catalyzed by single nickel atoms on nitrogen-doped graphene with stainless steel substrate
Xin Zhang, Zhejiang University – China. Submission ID: 26
- 13:15-13:30 N and P recovery from livestock wastewater by flow electrode capacitive deionization using a novel biochar-based porous carbon electrode
Dejia Liu, Zhejiang University – China. Submission ID: 43
- 13:30-13:45 Incorporating low temperature digesters and biogas absorption chillers at dairy facilities in Uganda
Rebecca Larson, University of Wisconsin-Madison – USA. Submission ID: 45
- 13:45-14:00 BREAK

Tuesday, October 25 – 14:00-15:00

THEMATIC SESSION III: SOCIAL, ENVIRONMENTAL, AND ECONOMIC PERSPECTIVES ON ENERGY SECURITY

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Rebecca Larson

Panelists: Dr. Rameshwar Kanwar, Dr. Ji-Qin Ni, Dr. Peter Livingston, Dr. Lifeng Luo, and others

15:00-15:15 **BREAK**

Location: Salon Multiuso, Plaza de la Autonomia, UCR

Tuesday, October 25 – 15:15 - 16:30

TECHNICAL SESSION IV: INNOVATIVE RENEWABLE ENERGY PRODUCTION TECHNOLOGIES-1

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Mr. Juan-Pablo Rojas Sossa

- | Time | Title, Author, Institution, Country |
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| 15:15-15:30 | Characterization of densification process of agricultural crop residues in Costa Rica
Pedro Casanova, Universidad de Costa Rica – Costa Rica. Submission ID: 33 |
| 15:30-15:45 | Continuous feed micro gasifier cookstove development
Dennis Elizondo-Montoya, Universidad de Costa Rica – Costa Rica. Submission ID: 35 |
| 15:45-16:00 | Effective electrochemical sulfide removal in aqueous media catalyzed by NiOOH/FeOOH in the oxide film of surface-oxidized stainless steel
Riyang Qi, Zhejiang University – China. Submission ID: 37 |
| 16:00 -16:15 | Two-phase anaerobic digestion of food waste with sludge produced from the electrocoagulation of black water
Sibel Uludag-Demirer, Michigan State University – USA. Submission ID: 39 |
| 16:15-16:30 | BREAK |

Tuesday, October 25 – 16:30-17:30

ACADEMIC LEADERSHIP MEETING

Location: Plaza de la Autonomia, UCR

Moderator(s): Dr. David Jones

Tuesday, October 25 – 19:00-21:00

DINNER AND CULTURAL PROGRAM

Location: TBD

WEDNESDAY, OCTOBER 26

Wednesday, October 26 – 08:30-11:30

TECHNICAL SESSION IV: INNOVATIVE RENEWABLE ENERGY PRODUCTION TECHNOLOGIES-2

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Manuel Garcia-Perez

Time	Title, Author, Institution, Country
08:30-08:45	Phosphorus removal and recovery via magnetic adsorption from fish farm sludge and wastewater Dezhao Liu, Zhejiang University – China. Submission ID: 42
08:45-09:00	Passive radiative cooling of fruits and vegetables to reduce food waste Zubin Varghese, Trane Technologies – India. Submission ID: 46
09:00-09:15	Development of an upflow anaerobic sludge blanket reactor for the production of biogas from cane biomass Julio César Borrero Neninger, Universidad de Holguín – Cuba. Submission ID: 56
09:15-09:30	Development of photovoltaic system as an alternative energy source for rural farmers in Nigeria Hamilton Chinwenyi, Raw Materials Research and Development Council, Maitama District, Federal Capital Territory, Abuja – Nigeria. Submission ID: 50
09:30-09:45	On the potential of salinity gradient plants for river mouths Fernando Tadeo, University of Valladolid – Spain. Submission ID: 5
09:45-10:00	BREAK
10:00-10:15	Techno-economic analysis and life-cycle assessment of co-production ethanol and probiotic yeast from sugar beets Yan Liu, Michigan State University – USA. Submission ID: 8
10:15-10:30	Technoeconomic and life cycle assessment of a microalgae biorefinery for an algae-based CO2 absorbent Ashley Cutshaw, Michigan State University – USA. Submission ID: 10
10:30-10:45	Economic feasibility of a novel biodigestion process for coffee drying in Costa Rica Mauricio Bustamante-Román, University San Pedro – Costa Rica. Submission ID: 20
10:45-11:00	Machine Learning: a promising approach for managing the bioconversion of waste to biofuels and bioenergy Hong Liu, Oregon State University – USA. Submission ID: 23
11:00-11:15	Strategies to improve economic and environmental indicators to produce sustainable aviation fuels Manuel Garcia-Perez, Washington State University – USA. Submission ID: 25
11:15-11:30	Densifying lignocellulosic biomass with alkaline/acidic chemicals unlocks highly fermentable sugars for biofuel and biochemical production Mingjie Jin, Nanjing University of Science and Technology – China, Submission ID: 60
11:30-12:30	LUNCH Location: Salon Multiuso, Plaza de la Autonomia, UCR

Wednesday, October 26 – 12:30-13:30

THEMATIC SESSION IV: INNOVATIVE RENEWABLE ENERGY PRODUCTION TECHNOLOGIES

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Manuel Garcia-Perez

Panelists: Dr. Hong Liu, Dr. Manuel Garcia-Perez, Dr. William Lubitz, Yan Liu, Mauricio Bustamante-Roman, and others

13:30-13:45 **BREAK**

Location: Salon Multiuso, Plaza de la Autonomia, UCR

Wednesday, October 26 – 13:45-15:45

TECHNICAL SESSION V: INTEGRATED FOOD, ENERGY, AND WATER SYSTEMS PERSPECTIVES ON ENERGY SECURITY

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Fernando Tadeo

Time	Title, Author, Institution, Country
13:45-14:00	Food-energy-water nexus solutions towards global sustainability Wei Liao, Michigan State University – USA. Submission ID: 13
14:00-14:15	Evaluation of pumping with wind energy for a farm Fernando Tadeo, University of Valladolid – Spain. Submission ID: 5
14:15-14:30	Mixed amino acid salt solutions for enhanced carbon dioxide capture in the power sector Annaliese Marks, Michigan State University – USA. Submission ID: 18
14:30-14:45	Water for Energy: perspectives on the Colombian Andean Region reviewed under a Food-Energy-Water (FEW) nexus framework (Colombia Cientifica Pasaporte a la Ciencia - Foco Alimentos) Camilo Torres, Purdue University / Pontificia Universidad Javeriana – USA. Submission ID: 22
14:45-15:00	Meeting global challenges with regenerative agriculture producing food and energy Bruce Dale, Michigan State University – USA. Submission ID: 40
15:00-15:15	Mineral-hydrogel composites for mitigating harmful algal bloom and supplying photo-biorefineries Yinjie Tang, Washington University – USA. Submission ID: 49
15:15-15:30	BREAK

Wednesday, October 26 – 15:30-16:30

THEMATIC SESSION V: INTEGRATED FOOD, ENERGY, AND WATER SYSTEMS PERSPECTIVES ON ENERGY SECURITY

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Fernando Tadeo and Mr. Jose F Aguilar Pereira

Panelists: Dr. Bruce Dale, Dr. Fernando Tadeo, Mr. Jose F Aguilar Pereira, Dr. Srinivasulu Ale, Dr. Margaret Gitau, Mr. Roger Garcia Quiros, others

16:30-16:45 **BREAK**

Location: Salon Multiuso, Plaza de la Autonomia, UCR

Wednesday, October 26 – 16:45-17:15

REPORTS ON HIGHLIGHTS OF THEMATIC SESSIONS (5 MINUTES EACH)

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Ajit Srivastava

Panelists: Moderators from each thematic session

Wednesday, October 26 – 17:15-17:30

CONFERENCE CLOSING CEREMONY

Location: Aula Magna, Plaza de la Autonomia, UCR

Moderator(s): Dr. Ajit Srivastava and Mr. Jose F Aguilar Pereira

THURSDAY, OCTOBER 27

Thursday, October 27 – 08:00-09:30

UNIVERSIDAD DE COSTA RICA CAMPUS TOUR

Location: UCR campus

Thursday, October 27 – 09:30-18:00

FIELD VISITS