

# **American Society of Agricultural and Biological Engineers Annual International Meeting (ASABE 2023)**

Omaha, Nebraska, USA  
9 – 12 July 2023

Volume 1 of 3

ISBN: 978-1-7138-8588-7

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2023) by American Society of Agricultural & Biological Engineers  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact American Society of Agricultural & Biological Engineers  
at the address below.

American Society of Agricultural & Biological Engineers  
2950 Niles Road  
St. Joseph, MI 49085  
USA

Phone: (269) 429-0300  
Fax: (269) 429-3852

[hq@asabe.org](mailto:hq@asabe.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## VOLUME 1

QUALITY CONTROL AND CROP CHARACTERIZATION FRAMEWORK USING UNMANNED AERIAL SYSTEMS (UAS) LIDAR POINT CLOUDS OVER AGRICULTURAL FIELDS .....	1
<i>Nadeem Fareed, Anup Kumar Das, Joao Paulo Flores</i>	
FILLET WELD STRENGTH ANALYSIS FOR CANTILEVER LOADING.....	12
<i>Tyler J. McPheron, Robert M. Stwalley</i>	
DESIGN AND DEVELOPMENT OF A PRELIMINARY REGRESSION MODEL TO DETERMINE THE DRIVING CAPABILITIES OF THE WELL-DRIVER PUP .....	24
<i>Grace L. Baldwin Kan-Uge, Tyler J. McPheron, Robert M. Stwalley</i>	
DESIGN STATUS AND IMPROVEMENT OPPORTUNITIES FOR FEED AND BEHAVIORAL MONITORING OF INDIVIDUALLY-HOUSED SOWS.....	31
<i>Samantha M. Neeno, Tyler C. Field, Mekenzie R. Cecil, Brian T. Richert, Jay S. Johnson, Allan P. Schinckel, Robert M. Stwalley</i>	
EFFECT OF SILICON ON THE WATER CONTENT IN PITAHAYA (HYLOCEREUS UNDATUS) CLADODES.....	37
<i>Jorge Flores-Velazquez, Aranza Hortencia Navarrete T</i>	
ASSESSING LENTIL MATURITY USING MACHINE LEARNING MODELS AND UASS MOUNTED MULTISPECTRAL AND LIDAR SENSORS .....	45
<i>Aliasghar Bazrafkan, Harry Navasca, Mario Morales, Nonoy Bandillo, Paulo Flores</i>	
AQUACULTURE INTENSIFICATION AND EMBODIED RESOURCE UTILIZATION .....	59
<i>David E Brune</i>	
GUAYULE GERMINATION AND GROWTH UNDER SUBSURFACE GRAVITY DRIP AND FURROW IRRIGATION IN ARIZONA .....	72
<i>Diaa Eldin M Elshikha, Said Attalah, Peter M Waller, Douglas J Hunsaker, Kelly R Thorp, Clinton Williams, Matthew Katterman, Debankur Sanyal, Guangyao Wang, David Dierig, Dennis T Ray</i>	
EXPERIMENTAL RESULTS IN A SILO MODEL WITH CORRUGATED STEEL WALLS AND ECCENTRIC HOPPERS .....	91
<i>Adriano Pinilla, J. Fuentes, Esperanza Ayuga, Marcos Madrid, Francisco Ayuga, Eutiquio Gallego</i>	
TECHNO-ECONOMIC ANALYSIS OF INTEGRATING FIRST-GENERATION (1G) WITH SECOND-GENERATION (2G) BIOETHANOL PRODUCTION WITH ONSITE ENZYME PRODUCTION FROM WET DDGS.....	102
<i>Attia Iram, Juliana Vasco-Correa, Deniz Cekmecelioglu, Ali Demirci</i>	
MICROPARTICLE-ENHANCED LIGNOCELLULOLYTIC ENZYME PRODUCTION USING DDGS AS THE MAIN FERMENTATION FEEDSTOCK .....	116
<i>Attia Iram, Deniz Cekmecelioglu, Ali Demirci</i>	

MEASUREMENT AND MODELING OF LACTATING SOW WATER USAGE .....	126
<i>Tyler C. Field, Samantha M. Neeno, Mekenzie R. Cecil, Brian T. Richert, Jay S. Johnson, Allan P. Schinckel, Robert M. Stwalley</i>	
DEVELOPMENT OF NONLINEAR BOUNCING TRACTOR MODEL WITH SEMI-ACTIVE AXLE SUSPENSION SYSTEM.....	133
<i>Masahisa Watanabe, Keisuke Kazama, Kenshi Sakai</i>	
ASSESSMENT OF GREEN CLUSTER HUSKING OF HAZELNUTS .....	137
<i>David Roy Bohnhoff</i>	
DEFINING PARTICLE SIZE DISTRIBUTION OF MILLED BIOMASS: SIEVE DIAMETER VERSUS SURFACE AREA .....	162
<i>Yidong Xia, Tiasha Bhattacharjee, Jordan Klinger, Eric Fillerup, John Aston, Vicki Thompson</i>	
REAL-TIME 3D TRACKING OF FLYING MOTHS USING STEREO VISION FOR LASER PEST CONTROL.....	173
<i>Ryo Sugiura, Ryo Nakano, Kazuki Shibuya, Koji Nishisue, Shinji Fukuda</i>	
A FRICTION AND VIBRATION MEASUREMENT DEVICE AND METHOD FOR FOOD TEXTURE EVALUATION BASED ON TACTILE SENSATION .....	180
<i>Liwen Huang, Dongdong Du, Chengjin Du, Chaoyi Yuan, Lingfeng Wang, Ruihao Zhang</i>	
A REAL-TIME VARIABLE RATE SPRAYER PROTOTYPE USING STEREO VISION FOR SPECIALTY CROPS .....	190
<i>Carla Roman, Hongyoung Jeon, Heping Zhu, Javier Campos, Erdal Ozkan</i>	
ML/DL IN AGRICULTURE THROUGH LABEL-EFFICIENT LEARNING.....	196
<i>Jiajia Li, Dong Chen, Zhaojian Li, Yanbo Huang, Daniel Morris</i>	
QUALITY EVALUATION OF TIGERNUT (CYPERUS ESCULENTUS L.) OIL - EFFECT OF PROCESSING PRETREATMENTS .....	227
<i>Paul A Omale, Ademola K Aremu, Mobolaji O Omobowale, Tosin O Olanrewaju, Akinbode O Adedeji</i>	
WHY DO MICROWAVES HEAT OIL FASTER THAN WATER?.....	238
<i>Xu Zhou, Shuang Zhang, Pawan Takhar, Patrick Pedrow, Shyam Sablani, Juming Tang</i>	
LIFE CYCLE ASSESSMENT OF SMART AGRICULTURE AS A METHOD FOR OPTIMIZATION TO CLIMATE CHANGE ADAPTION.....	247
<i>Omar Hijazi, Pamela Andrea Pedrero Diaz Abarca, Francisco Pedrero Salcedo, Teresa Gubbuk, Faissal Aziz, Mona Maze, Amina Richa, Sami Touil, Christoph Bader</i>	
DEEP DATA AUGMENTATION FOR WEED RECOGNITION ENHANCEMENT: A DIFFUSION PROBABILISTIC MODEL AND TRANSFER LEARNING BASED APPROACH.....	254
<i>Dong Chen, Xinda Qi, Yu Zheng, Yuzhen Lu, Yanbo Huang, Zhaojian Li</i>	
EFFECTS OF WATER UNIFORMITY OF A DRIP IRRIGATION SYSTEM ON CORN AND SUNFLOWER GROWTH IN A GREENHOUSE TRIAL .....	265
<i>Salman Alanazi, Lin Wei, Robiul Islam Rubel, Abdulkarim Aldekhail, Kasiviswanathan Muthukumarappan</i>	
ENHANCING WATER SECURITY AT SMALL-SCALE BY INTEGRATING RAINWATER HARVESTING, WASTEWATER REUSE AND POINT-OF-USE WATER TREATMENT TECHNOLOGIES.....	271
<i>Anish Jantrania, June Wolfe</i>	

SMARTPHONE-ASSISTED APPLE SCAB IDENTIFICATION AND QUANTIFICATION USING ARTIFICIAL INTELLIGENCE .....	275
<i>Yanqiu Yang, Long He, Kari A. Peter</i>	
CAGE FREE HENS' FEATHER PECKING MANAGEMENT .....	285
<i>Ramesh Bahadur Bist, Lilong Chai, Xiao Yang, Sachin Subedi</i>	
EFFECTS OF ARTIFICIAL DUSK LIGHTING ON PERCHING BEHAVIORS OF CAGE-FREE LAYING HENS.....	290
<i>Ramesh Bahadur Bist, Lilong Chai, Xiao Yang, Sachin Subedi</i>	
DEVELOPMENT AND IMPLEMENTATION OF A DAMAGE MODEL FOR POTATO TUBER BLACKSPOT IN DISCRETE ELEMENT METHOD TO ANALYZE HARVESTING AND HANDLING PROCESSES .....	295
<i>Lukas Poppa, Ludger Frerichs, Jintian Liu, Markus Bol</i>	
SOYBEAN OIL-BASED THERMOSET RESINS USING HALLOYSITE NANO CLAY AS A REINFORCING FILLER: AN INVESTIGATION INTO EFFECTS OF CONCENTRATION AND SURFACE MODIFICATION.....	303
<i>Shahab Saedi, Abdus Subhan, Magdalene K Hoff, Mudasir Ahmad, Kasiviswanathan Muthukumarappan</i>	
EVALUATIONS OF ALTERNATE TEST MATERIAL FOR ISO 22368-1 STANDARD TEST .....	316
<i>Carla Roman, Hongyoung Jeon, Heping Zhu, Erdal Ozkan, Sunjeong Park, Adam Barlow, Kody Sjoblom</i>	
CONTROLLED ENVIRONMENT AGRICULTURE DESIGN STANDARDS (CEADS): PURPOSE, DEVELOPMENT, AND IMPLEMENTATION .....	325
<i>Gary W Stutte, Charles H Parrish, II, Jessica M Buncek, Weslynn S Ashton, Rebekah E Waller, Matthew Liotta, Simone Valle De Souza, Gene A Giacomelli, Tharindu P Weeraratne, Corinne Wilder, Brady Nemeth, Charles Wu, David Kessler, Mark G Lufsrud, Penny M</i>	
IMPLEMENTATION OF A SENSOR MONITORING SYSTEM TO IMPROVE IRRIGATION MANAGEMENT THROUGH ON-FARM DEMONSTRATION .....	337
<i>Brenden Kelley, Martin Chilvers, Lyndon Kelley, Steve Miller, Younsuk Dong</i>	
MODELLING TIRE TRACTIVE PERFORMANCE AT LOWER INFLATION PRESSURES .....	347
<i>Austin R Hamm, Ario Kordestani, Brian L Steward, Stuart J Birrell</i>	
A COMPARATIVE STUDY ON DEEP LEARNING ALGORITHMS PERFORMANCE ON FLAX CROP BOLL-COUNTING FROM CROP RGB IMAGES.....	360
<i>Nadia Delavarpour, Jithin Mathew, Justice Aduteye, Paulo Flores</i>	
VERTICAL PANEL AGRI-PHOTOVOLTAIC SYSTEM DESIGN FOR EFFICIENT AND PRODUCTIVE CROP PRODUCTION .....	371
<i>Karl J. Wild, John K. Schueller</i>	
GULLY EROSION SUSCEPTIBILITY MAPPING USING THE STACKING ENSEMBLE MACHINE LEARNING METHOD .....	383
<i>Jeongho Han, Jorge A. Guzman, Maria L. Chu</i>	
ANALYZING MONTANA AGRICULTURE GROWTH THROUGH THE ADOPTION OF PRECISION TECHNOLOGIES .....	391
<i>Shirin Ghatrehsamani, Gaurav Jha</i>	
FRICITION PHENOMENA IN A SILO MODEL WITH CORRUGATED STEEL WALLS.....	396
<i>Adriano Pinilla, J.Fuentes, Wiacek Joanna, Francisco Ayuga, Eutiquio Gallego</i>	

EFFECT OF TRAVEL SPEED ON SPRAY DEPOSITION USING A STEREO VISION VARIABLE RATE SPRAYER PROTOTYPE .....	407
<i>Carla Roman, Hongyoung Jeon, Heping Zhu, Javier Campos, Erdal Ozkan</i>	
THE ASSESSMENT OF GROWTH PERFORMANCE OF DIFFERENT CROPS USING CONTROLLED ENVIRONMENT AGRICULTURE .....	414
<i>George Paul Buss, Mya Alexandria Catherine Griffith, Paige Ann Carroll, Xiusheng Yang, John L Griffis, Jr., Galen Papkov, Sarah Bauer, Kathryn Jackson, Ankit Kumar Singh</i>	
THE COMPARATIVE PERFORMANCE OF PLUG PREPARATION USING DIFFERENT FERTILIZER CONCENTRATIONS AND SOURCES .....	425
<i>George Paul Buss, Mya Alexandria Catherine Griffith, Paige Ann Carroll, Xiusheng Yang, John L Griffis, Galen Papkov, Sarah Bauer, Kathryn Jackson, Ankit Kumar Singh</i>	
DEVELOPING MACHINE LEARNING AND DEEP LEARNING SOIL MOISTURE MODELS FOR PRECISION AGRICULTURAL APPLICATIONS .....	433
<i>Xiaomo Zhang, Zhulu Lin, Xin (Rex) Sun</i>	
APPLICATION OF DEEP LEARNING METHODS AND GAS CHROMATOGRAPHY-MASS SPECTRA TO DEVELOP PREDICTIVE MODELS FOR SPECIALTY COFFEE ODOR.....	443
<i>Chih-Yun Tsai, Yu-Tang Chang, Shih-Fang Chen</i>	
NON-DESTRUCTIVE ASSESSMENT OF WHITE STRIPING IN BROILER BREAST MEAT USING STRUCTURED ILLUMINATION REFLECTANCE IMAGING AND DEEP LEARNING .....	449
<i>Ebenezer Olaniyi, Yuzhen Lu, Anuraj Theradiyil Sukumaran, Tessa Jarvis, Clinton Rowe</i>	
EXPERIMENTAL STUDIES ON THE ENERGY CONSUMPTION OF THE SLIDING AND SHEARING COMBINATION SUGARCANE BASECUTTER .....	462
<i>Jun Qian, Shaochun Ma, Songhao Kang, Wenzhi Li, Peng Huo, Weiqing Li</i>	
STUDY OF AERODYNAMIC CHARACTERISTICS OF SUGARCANE COMPONENTS AND EXPERIMENT ON IMPURITY REMOVAL PERFORMANCE.....	468
<i>Wenzhi Li, Shaochun Ma, Yongzheng Gao, Jun Qian, Weiqing Li, Cong Peng</i>	
SUGARCANE FEEDING QUANTITY DETECTION BASED ON DEPTH LEARNING .....	480
<i>Cong Peng, Shaochun Ma, Linguang Zhang, Chenyang Su, Wenzhi Li</i>	
DEFICIT IRRIGATION MANAGEMENT OF SUGAR BEET USING CANOPY TEMPERATURE BASED CROP WATER STRESS INDEX.....	491
<i>Bradley A. King, David D. Tarkalson, David L. Bjorneberg</i>	
IMAGE-BASED ASSESSMENT OF VEGETATION COVER AND COMPOSITION USING U- NET-BASED SEMANTIC SEGMENTATION.....	512
<i>Puranjit Singh, Yin Bao, Michael A. Perez, Wesley N. Donald</i>	
THE IMPACT OF SOLIDS RETENTION TIME REDUCTION ON THE THERMAL HYDROLYSIS PRETREATMENT-ENHANCED MESOPHILIC ANAEROBIC DIGESTION.....	523
<i>Yitao Li, Hao Luo, Mary Strawn, Lisa Racey, Fasil Haile, Brian Balchunas, Christopher Moline, Lawrence Hentz, Zhi-Wu Wang</i>	
THE COMPARATIVE PERFORMANCE OF NUTRIENT FILM TECHNIQUE AND DEEP- WATER CULTURE HYDROPONICS METHOD USING GREENBOX TECHNOLOGY .....	529
<i>Mya Alexandria Catherine Griffith, George Paul Buss, Paige Ann Carroll, Xiusheng Yang, John L Griffis, Jr., Galen Papkov, Sarah Bauer, Kathryn Jackson, Ankit Kumar Singh</i>	
A RADIATIVE TRANSFER-BASED PLANT IMAGE SYNTHESIS FRAMEWORK.....	539
<i>Tong Lei, Brian N Bailey</i>	

STUDIES ON MECHANICAL PROPERTIES OF SUGARCANE TOPS .....	548
<i>Peng Huo, Shaochun Ma, Songhao Kang, Guanglin Zhang</i>	
PATH PLANNING OF APPLE TREE PRUNING ROBOT BASED ON IMPROVED RRT ALGORITHM.....	553
<i>Ye Chen Li, Shaochun Ma, Lingfeng Li, Chenyang Su, Zhengliang Ding</i>	
THE EFFECT OF ULTRAVIOLET RADIATION ON SUCROSE AND MICROORGANISM IN SUGARCANE.....	563
<i>Lingfeng Li, Shaochun Ma, Xi Zeng, Chenyang Su, Ye Chen Li</i>	
CFD SIMULATION ANALYSIS AND EXPERIMENTAL VERIFICATION OF HYBRID RICE POLLEN DIFFUSION PROCESS.....	570
<i>Te Xi, Sifang Long, Yongwei Wang, Huaiqu Feng, Jun Wang</i>	
THE COMPARATIVE PERFORMANCE OF SOIL-BASED SYSTEMS WITH HYDROPONICS .....	581
<i>Paige Ann Carroll, Mya Alexandria Catherine Griffith, George Paul Buss, Xiusheng Yang, John L Griffiths, Jr., Galen Papkov, Sarah Bauer, Kathryn Jackson, Ankit Kumar Singh</i>	
GREEN SYNTHESIS OF EPOXIDIZED SOYBEAN OIL FOR BIO-RESIN IN SUSTAINABLE PACKAGING APPLICATION .....	589
<i>Abdus Sobhan, Shahaboddin Saedi, Magdalene Hoff, Lin Wei, Kasiviswanathan Muthukumarappan</i>	
AN AUTOMATED ONLINE LEARNING FRAMEWORK FOR INSECT PEST IMAGE CLASSIFICATION MODEL ENHANCEMENT .....	598
<i>Ching-Kuang Chen, Ta-Te Lin</i>	
DAIRY COW HEALTH STATUS EVALUATION BASED ON MULTI-SENSOR DATA FUSION AND MACHINE LEARNING .....	608
<i>Shao-Zheng Huang, Yue-Shao Chen, Jih-Tay Hsu, Ta-Te Lin</i>	
APPLICATION OF A VISUAL-BASED AUTONOMOUS DRONE SYSTEM FOR GREENHOUSE MUSKMELON PHENOTYPING .....	617
<i>Jun-Yan Wang, Ta-Te Lin</i>	
TOPOLOGY DISCUSSION OF DECARBONIZED COMBINE HARVESTING SOLUTIONS.....	628
<i>Fabian Wohlfahrt, Thomas Goeres, Stefan Teroerde, Ludger Frerichs</i>	
ON THE CURRENT STATE OF SOFTWARE DEVELOPMENT FOR AGRICULTURAL EQUIPMENT IN THE DAWN OF IOT-ECOSYSTEMS.....	639
<i>Maximilian Treiber, Simon Grebner, Samuel Spierer, Heinz Bernhardt</i>	
BIOMETHANE POTENTIAL OF FRESH HORSE MANURE AND STRAW-BASED LITTER.....	652
<i>Alessandro Chiumenti, B. Owono, Francesco Da Borsio</i>	
MULTI-AGENT PATH PLANNING IN APPLE ORCHARD WITH TIGHT TREE ROWS BASED ON IMPROVED A-STAR ALGORITHM FOR FROST PROTECTION .....	659
<i>Weiyun Hua, Paul Heinemann, Long He</i>	
EFFECT OF TEMPERATURE CHANGES TO ANAEROBIC CO-DIGESTION OF OILY MATERIALS WITH HIGH-ORGANIC LOADING RATES IN THERMOPHILIC CONDITIONS.....	669
<i>Cuong Manh Duong, Teng Teeh Lim</i>	
INDIVIDUAL PIGS' IDENTIFICATION USING DEEP LEARNING.....	676
<i>Shiva Paudel, Tami Brown-Brandl, Gary Rohrer, Sudhendu Raj Sharma</i>	

## VOLUME 2

PREDICTING THE ACCEPTANCE OF THE INTRODUCTION OF ENERGY MANAGEMENT SYSTEM AND TESTING ITS FUNCTIONALITY IN AUTOMATED BARN SYSTEMS - COWENERGYSYSTEM"" .....	681
<i>Christoph Bader, Heinz Bernhardt</i>	
A SIMPLE AND PRACTICAL STUDY ON THE SPATIAL VARIATION OF ULTRAVIOLET AND VISIBLE LIGHT OUTPUT: MEASUREMENT AND ESTIMATION OF NEAR- AND FAR-DISTANCE CONDITIONS.....	688
<i>Peiyang Li, Jacek A. Koziel, Bauyrzhan Yedilbayev, Reid Vincent Paris, William B. Walz, Brett C. Ramirez</i>	
FLOW RATE MODULATION CAPABILITY AND DROPLET SIZE SPECTRUM OF AN AIR-PILOTED PWM PINCH VALVE COUPLED WITH HOLLOW-CONE NOZZLES .....	701
<i>Javier Campos, Heping Zhu, Hongyoung Jeon, Raman Salcedo, Carla Roman, Erdal Ozkan</i>	
FLOW RATE MODULATIONS AND DROPLET SIZE DISTRIBUTIONS OF PWM-CONTROLLED HOLLOW-CONE NOZZLES OPERATED AT HIGH FREQUENCIES AND PRESSURES .....	705
<i>Javier Campos, Heping Zhu, Hongyoung Jeon, Carla Roman, Erdal Ozkan, Emilio Gil</i>	
A COMPARISON STUDY OF DIFFERENT STRATEGIES FOR ENHANCING METHANE PRODUCTION FROM ANAEROBIC CO-DIGESTION OF POULTRY LITTER WITH WHEAT STRAW .....	710
<i>Yuanhang Zhan, Yiting Xiao, Ndeddy Aka Robinson Jr., Sarah Wu, Zhiwu Wang, Jun Zhu</i>	
SOIL SENSING MAPPING ON PADDY FIELDS IN SOUTH KOREA .....	723
<i>Juneyoung Han, Yongjin Cho, Dae-Cheol Kim, Myoungkyoon Yang</i>	
PRESCRIPTION MAP BASED ON SOIL PROPERTIES FOR VARIABLE RATE FERTILIZATION .....	731
<i>Ju Won Shin, Yongjin Cho, Dae-Cheol Kim, Seung-Min Kim</i>	
IMPACTS OF FLOODING INDUCED SALINITY ON SOIL HYDROLOGY AND NUTRIENT LEACHING FROM A POORLY DRAINED MARL SOIL.....	736
<i>Niguss Solomon Hailegnaw, Haimanote K Bayabil, Fitsum Teshome, Yuncong Li, Bin Gao</i>	
EVALUATION METHOD AND EXPERIMENT OF VO ROTATION ACCURACY IN AGRICULTURAL RUGGED ENVIRONMENT.....	739
<i>Fangwei Hong, Xiaoqiang Du, Zenghong Ma, Yuechan Li</i>	
SCALING STRATEGY OF BAU RECIRCULATING PADDY DRYER IN BANGLADESH: CHALLENGES AND SOLUTIONS .....	748
<i>Chayan Kumer Saha, Sahabuddin Ahamed, Surajit Sarkar, Ismat Ara Begum, Md. Monjurul Alam</i>	
BAU-STR DRYER FOR DRYING MAIZE FOR UNDERSERVED COMMUNITY IN BANGLADESH.....	754
<i>Chayan Kumer Saha, Sahabuddin Ahamed, Md. Abu Yousuf Prodhan, Md. Abdul Momin, Shahidul Islam, Md. Monjurul Alam</i>	
AGRIPRENEURIAL MODELS FOR SUSTAINABLE AGRICULTURAL MECHANIZATION IN BANGLADESH.....	759
<i>Md. Monjurul Alam, Chayan Kumer Saha, Md. Rostom Ali, Sahabuddin Ahamed, Surajit Sarkar, Lavlu Mozumdar, Md. Mosharrof Hussain, Nusrat Tasnim, Prasanta K. Kalita</i>	



MACHINE LEARNING APPLICATION IN SLOW PYROLYSIS OF BIOMASS TO PREDICT BIOCHAR YIELD AND QUALITY .....	768
<i>Priyabrata Pradhan, Daniel Joseph Sweeney</i>	
THE COMPENSATION ALGORITHM OF DISTANCE MEASUREMENT ERRORS FOR ORANGE PICKING MANIPULATOR IN HILLY ORCHARD .....	773
<i>Yifan Wang, Baoqin Yang, Yan Li, Xipeng Yang, Weiqi Li, Jie Liu</i>	
IMPACT OF BACILLUS SUBTILIS ON MANURE SOLIDS, ODOR, AND MICROBIOME .....	783
<i>Okhwa Hwang, Steven Trabue, Yeo-Myeong Yun</i>	
APPLICATION OF HYPERSPECTRAL IMAGING FOR IDENTIFICATION OF TYPES AND LEVELS OF PEST DAMAGE ON TEA LEAVES.....	794
<i>Yu-Hung Lin, Xiu-Rui Lin, Shih-Fang Chen</i>	
AN IMU BASED DAIRY COW BEHAVIOR RECOGNITION SYSTEM FOR HEALTH MONITORING USING MACHINE LEARNING .....	801
<i>Hua-Ta Liang, Shu-Wen Hsu, Jih-Tay Hsu, Chia-Jui Tu, Yi-Chu Chang, Chua Teck Jian, Ta-Te Lin</i>	
CASCADE PREDICTION OF THE DAY OF YEAR OF WINTER WHEAT DEVELOPMENTAL STAGES IN HOKKAIDO, JAPAN.....	814
<i>Chisa Iwasaki, Seiji Shimoda, Ryo Sugiura, Genichiro Kikui, Yoichi Sugikawa</i>	
SYSTEM ARCHITECTURE FOR THE COMBINATION OF SMART AGRICULTURAL IMPLEMENTS WITH HIGHLY AUTOMATED TOWING VEHICLES, FROM THE IMPLEMENT MANUFACTURER'S POINT OF VIEW .....	820
<i>Sebastian Rottgermann, Henning Hecheltjen, Stefan Haverkamp</i>	
A WEB-BASED INTERFACE FOR AUTOMATIC POLLUTANT EMISSION ESTIMATIONS IN POULTRY FACILITIES .....	826
<i>Joshua Dotto, Yijie Xiong, Santosh K. Pitla, Richard S. Gates</i>	
CROP GROWTH MODEL: OPTIMAL APPLICATION OF NITROGEN FERTILIZER IN CORN FOR ECONOMIC RETURNS AND ENVIRONMENTAL SUSTAINABILITY .....	833
<i>Harsh Pathak, Dennis Buckmaster, Charlie Messina, Diane Wang</i>	
DETECTION AND SEGMENTATION OF ANTHRACNOSE LEAF SPOTS IN FLOWERING DOGWOOD USING DEEP LEARNING FOR SITE-SPECIFIC MANAGEMENT.....	844
<i>Aleena Rayamajhi, Md Sultan Mahmud</i>	
REAL-TIME BUD DETECTION USING YOLOV4 FOR AUTOMATIC APPLE FLOWER BUD THINNING .....	854
<i>Rashmi Sahu, Long He</i>	
THE EFFECT OF BOOM LEVELING ON SPRAY DISPERSION .....	865
<i>Miguel Bustamante, Juan F Vivanco, Travis A Burgers</i>	
DESIGN AND EXPERIMENT OF THE ELECTRIC FLEXIBLE COMB BRUSH HARVESTER FOR CAMELLIA OLEIFERA FRUIT .....	871
<i>Xintao Han, Tengfei Shen, Ning Chen, Xiaoqiang Du, Zenghong Ma</i>	
HOW THE OPERATION AND MONITORING OF A MODERN AND HIGHLY AUTOMATED SEEDER WITH ADVANCED CONNECTIVITY IS SIMPLIFIED BY SMARTPHONE APPS .....	878
<i>Klemens Surmann, Henning Hecheltjen</i>	

TRANSIENT HEAT CONDUCTION IN COFFEE BEANS EXPOSED TO FAR-INFRARED RADIATION - MODELLING AND SIMULATION.....	883
<i>S. L. Karapitiya, K. S. P. Amaratunga, H. K. P. P. Kariyawasam, E. M. A. C. Ekanayake, D. M. S. P. Bandara</i>	
ANAEROBIC DIGESTION FOR THE IMPROVEMENT OF THE ENERGETIC SUSTAINABILITY OF DAIRY FARMS: LAB-SCALE ASSESSMENT OF THE BMP OF DAIRY MANURE AND WHEY, AND ON-SITE PILOT SCALE STRESS TEST.....	892
<i>Alessandro Chiumenti, B. Owono, Veronica Pezzato, Francesco Da Borso</i>	
TECHNOLOGY AND YIELD EFFECTS OF SUBSOIL MELIORATION BY ADMIXING ORGANIC MATERIALS .....	901
<i>Oliver Schmittmann, Andreas Christ, Peter Schulze Lammers</i>	
WHY AND HOW TO BRING DIGITAL TWINS TO THE VALUE ADDED CHAIN OF BIOMASS AND WASTE PROCESSING PLANTS?.....	907
<i>Arman Arefi, Nader Marzban, Agata Olszewska-Widdrat, Christiane Herrmann, Thomas Hoffmann, Michael Horf, Barbara Sturm</i>	
QUANTLYZER: AN R PACKAGE FOR AUTOMATED EXPLORATORY AND PREDICTIVE DATA ANALYSIS.....	920
<i>Fengkai Tian, Jianfeng Zhou</i>	
COTTON EMERGENCE UNIFORMITY ASSESSMENT USING REMOTE SENSING AND MACHINE LEARNING .....	930
<i>Fengkai Tian, Jianfeng Zhou</i>	
USING NONTRADITIONAL WATER SOURCES AND IMPLEMENTING WATER CONSERVATION PRACTICES UNDER CHANGING CLIMATE.....	938
<i>Azbina Rahman, Masoud Negahban-Azar, Adel Shirmohammadi</i>	
DESIGN OF END-EFFECTORS FOR APPLE ROBOTIC THINNING IN THE GREEN FRUIT STAGE .....	947
<i>Kittiphum Pawikhum, Paul Heinz Heinemann, Long He, Henry Joseph Sommer, Randall Gray Bock</i>	
NIR SPECTROSCOPY AND CHEMOMETRICS FOR DETECTING SOME SELECTED COMPONENTS OF LIPID-PRODUCING SORGHUM BIOMASS FOR BIOFUELS .....	961
<i>Md Wadud Ahmed, Carlos Esquerre, Vijay Singh, Andrew D. B. Leakey, Mohammed Kamruzzaman</i>	
QUANTIFICATION OF LODGING SCORES OF SOYBEAN BREEDING LINES USING UAV-BASED IMAGERY AND MACHINE LEARNING .....	966
<i>Shagor Sarkar, Jing Zhou, Andrew Scaboo, Jianfeng Zhou</i>	
A NOVEL COMPREHENSIVE INTERPOLATION TO PRODUCE SPATIOTEMPORALLY CONTINUOUS DAILY EVAPOTRANSPIRATION .....	975
<i>Jeongho Han, Jorge A. Guzman, Maria L. Chu</i>	
AGRICULTURAL MACHINERY SAFETY BEHAVIOR AMONG YOUTH .....	983
<i>Michael L. Pate, Rebecca G. Lawver, Dustin K. Perry, Scott W. Smalley, Celina Wille, Don Edgar, Jim Hafer, Marvin Young</i>	
SYNTHETIC DATA-DRIVEN AI USING MIXTURE OF RENDERED AND REAL IMAGING DATA FOR STRAWBERRY YIELD ESTIMATION .....	988
<i>Omeed Mirbod, Daeun Choi</i>	

IMPROVING FHB SCREENING IN WHEAT BREEDING USING AN EFFICIENT TRANSFORMER MODEL .....	993
<i>Babak Azad, Ahmed Abdalla, Kwanghee Won, Ali Mirzakhani Nafchi</i>	
ASSESSMENT OF LOW-COST AND HIGH-END SOIL MOISTURE SENSORS AT VARIOUS MOISTURE RANGE AND SOIL TEXTURES.....	1003
<i>Rajesh Nandi, Dev Sagar Shrestha</i>	
THE ELECTRIC MOBILE CARRIER PLATFORM FOR ASPARAGUS FIELDS AND ON-SITE ASSESSMENTS .....	1013
<i>Chia-Chun Chien, Cheng-Yu Chueh, An-Chi Liu, Cheng-Chun Lee, Po-Shao Chen, Shan-Cheng Chang, Han-Bin Chang, Joe-Air Jiang, Jen-Cheng Wang, Ming-Hsien Hsieh, Jui-Chu Peng, Ming-Chi Guo, Cheng-Ying Chou</i>	
DEEP LEARNING-ASSISTED AUTOMATIC ASPARAGUS HARVESTER: ENHANCING EFFICIENCY AND ACCURACY IN TAIWAN'S PRECISION AGRICULTURE.....	1021
<i>Po-Shao Chen, Shan-Cheng Chang, Han-Bin Chang, Wei-Hao Huang, Cheng-Yu Chueh, Cheng-Chun Lee, Chia-Chun Chien, Joe-Air Jiang, Jen-Cheng Wang, An-Chi Liu, Ming-Hsien Hsieh, Jui-Chu Peng, Ming-Chi Guo, Cheng-Ying Chou</i>	
DEEP LEARNING FOR TRACKING HONEYBEE AND POLLEN MOVEMENT IN FACILITY CULTIVATION .....	1027
<i>Han-Bin Chang, Shan-Cheng Chang, Cheng-Yu Chueh, Hung-Jen Lin, Joe-Air Jiang, An-Chi Liu, En-Cheng Yang, Hsiang-Wen Hsieh, Cheng-Ying Chou</i>	
ECONOMIC FEASIBILITY CASE STUDY OF ANAEROBIC CO-DIGESTION OF DAIRY MANURE AND FOOD WASTE ON A NORTHERN NY DAIRY .....	1032
<i>Lauren Ray, Angela George, Peter E Wright</i>	
MAINTAINING OPTIMUM CLOSEUP IN WHEAT FHB DETECTION USING 360-DEGREE DEEP SCANNING METHOD.....	1043
<i>Ahmed Khalid Alsayed Abdalla, Babak Azad, Kwanghee Won, Ali Nafchi</i>	
DELAY TOLERANT NETWORKING BASED ON MACHINE-TO-MACHINE COMMUNICATIONS .....	1050
<i>Fabio A. Castiblanco, James V. Krogmeier, David J. Love, Dennis R. Buckmaster</i>	
DEVELOPMENT OF THE AGRICULTURAL VIBRATION DATA ACQUISITION PLATFORM (AVDAQ) .....	1061
<i>Evan Ridder, Edwin Brokesh, Shaghayegh Janbazialamdari, Benjamin Vail</i>	
ABOVEGROUND BIOMASS ESTIMATION OF TALL FESCUE USING AERIAL AND GROUND-BASED SYSTEMS.....	1074
<i>Jasanmol Singh, Ali Bulent Koc, Matias Jose Aguerre</i>	
DEVELOPMENT OF A LIVESTOCK TRANSPORT VIBRATION SIMULATOR .....	1080
<i>Evan J Ridder, Edwin Brokesh, Shaghayegh Janbazialamdari, John M Gonzalez, Daniel Flippo</i>	
YIELD RESPONSES OF WATERMELON, MUSKMELON, AND SQUASH TO DIFFERENT IRRIGATION TREATMENTS IN A MULCHED SANDY SOIL.....	1090
<i>Bhuwan Prasad Shah, Uday Bhanu Prakash Vaddevolu, Xinhua Jia, Harlene Hatterman-Valenti, Thomas F Scherer</i>	
AUTHENTICATION OF PREMIUM TEA BASED ON GEOGRAPHICAL ORIGIN USING NIR SPECTROSCOPY AND MULTIVARIATE ANALYSIS.....	1109
<i>Camila Hammel Sobreira, Marcus V. Da Silva Ferreira, Mohammed Kamruzzaman</i>	

AUTOMATIC ALL-TERRAIN VEHICLE CRASH DETECTION .....	1115
<i>Guilherme De Moura Araujo, Farzaneh Khorsandi, Austin James Wald, Daniel Christopher Weatrowski</i>	
FLASH DROUGHT ONSET AND DEVELOPMENT ANALYSIS USING FLASH DROUGHT INTENSITY INDEX (FDII) IN SOUTH KOREA .....	1120
<i>Hee-Jin Lee, Won-Ho Nam, Jason Otkin, Yafang Zhong, Mark Svoboda</i>	
APPLICATION OF OBJECTIVE DROUGHT BLEND (ODB) FOR DROUGHT MONITORING IN SOUTH AND NORTH KOREA .....	1128
<i>Young-Sik Mun, Won-Ho Nam, Jong-Won Do, Kwang-Ya Lee</i>	
ASSESSMENT OF WATER SUPPLY RELIABILITY FOR AGRICULTURAL RESERVOIRS USING BIG DATA AND CLIMATE VARIABILITY .....	1135
<i>Mi-Hye Yang, Won-Ho Nam</i>	
PROJECTED SPATIO-TEMPORAL VARIATIONS OF SOIL MOISTURE DROUGHT UNDER CMIP6 CLIMATE CHANGE SCENARIOS .....	1140
<i>Min-Gi Jeon, Won-Ho Nam, Eun-Mi Hong</i>	
MODELING IRRIGATION CANAL NETWORK FLOW FOR RETURN FLOW ON AGRICULTURAL WATERSHED USING EPA-SWMM .....	1146
<i>Ji-Hyeon Shin, Won-Ho Nam, Suat Irmak, Vivek Sharma, Xiang Zhang</i>	
ASSESSMENT OF WATER BALANCE MODEL FOR WATER SUPPLY SYSTEM AND RESERVOIR LINKAGE OPERATION .....	1155
<i>Dong-Hyun Yoon, Won-Ho Nam</i>	
BARRIERS TO ADOPTION OF PRECISION AGRICULTURE COMPETENCIES IN SECONDARY AGRICULTURE EDUCATION PROGRAMS: A CASE STUDY .....	1162
<i>Chad A Reynolds, John D Tummons, Rebecca L Mott</i>	
IMPACT OF CRATE DESIGN AND NUMBER OF HEAT LAMPS ON THE OCCURRENCE OF SHOULDER LESIONS IN SOWS .....	1169
<i>Shubham Bery, Tami Brown-Brandl, Gary Rohrer, Raj Sharma</i>	
COMPARATIVE LIFE CYCLE ASSESSMENT OF FARBOT TECHNOLOGY WITH CONVENTIONAL AND ORGANIC AGRICULTURE.....	1174
<i>Omar Hijazi, David Schoo, Andreas Schweiger, Mona Maze, Heinz Bernhardt</i>	
ELECTROSPINNING OF NORTHERN ALABAMA GROWN HEMP EXTRACT IN PVA TO DEVELOP AN ACTIVE PACKAGING FILM.....	1188
<i>Aaron Dudley, Lamin Kassama, Armitra Jackson-Davis, Joongmin Shin, Zhigang Xiao, Ernest Cebert</i>	
ELECTROSPINNING OF CURCUMIN ULTRAFINE CHITOSAN NANOFIBER FOR THE SHELF LIFE EXTENSION OF PACKAGED BEEF .....	1207
<i>Edwin O Ochieng, Lamin S Kassama, Joongmin Shin, Armitra Jackson-Davis</i>	
AI-TEST-FIELD - AN AGRICULTURAL TEST ENVIRONMENT FOR SEMANTIC ENVIRONMENT PERCEPTION WITH RESPECT TO HARSH AND CHANGING ENVIRONMENTAL CONDITIONS.....	1217
<i>Jan Christoph Krause, Jaron Martinez, Henry Gennet, Martin Urban, Jens Herbers, Stefan Menke, Sebastian Rattgermann, Dr.-Ing., Joachim Hertzberg, Arno Ruckelshausen</i>	
AEF PROPOSAL FOR INTEROPERABLE SECURE WIRELESS M2M COMMUNICATION.....	1222
<i>Bardley Nielsen, Tobias Nothdurft, Andreas Vollbracht, Johann Witte, Norbert Schlingmann</i>	

QUALITY CHARACTERISTICS OF TUNNEL DRIED TOMATOES .....	1231
<i>Nana A. Rockson, Paxwell D. Adjei, Joseph O. Akowuah, Ato Bart-Plange</i>	
CFD ANALYSIS FOR THE DESIGN OF CONTAINER-TYPE INDOOR FARMS FOR THE CULTIVATION OF TALL CROPS SUCH AS HEMP.....	1238
<i>Seoung Hee Kim, Jeong Min Lee, Seung Chul Lee, Jeong Wook Heo</i>	
THE REVISED ECONOMICS OF THE EFFECTS OF TRAFFIC MANAGEMENT FOR THREE DEPTHS OF TILLAGE OVER AN EIGHT YEAR ARABLE ROTATION .....	1242
<i>Richard J Godwin, David R White, Edward Dickin, Magdalena Kaczorowska-Dolowy, Anthony Millington, Emily K Pope, Paula A Misiewicz</i>	
QUANTIFYING THE WHEELED AREA OF A RANDOM TRAFFIC, NO-TILLAGE SOYBEAN PRODUCTION SYSTEM.....	1254
<i>Guido F. Botta, Diogenes L. Antille, Diego G. Ghelfi, David Rivero, Alejandra Ezquerra- Canalejo</i>	
NON-DESTRUCTIVE BIOMASS ESTIMATION FOR HYDROPONIC LETTUCE PRODUCTION .....	1260
<i>Mike O. Ojo, Azlan Zahid</i>	
CHARACTERIZING BIOCHAR NITROGEN AND PHOSPHORUS SORPTION PROPERTIES TO CLOSE THE LOOP IN THE CIRCULAR NUTRIENT ECONOMY .....	1270
<i>Evanna McGuinness, Maja Arsic, Diogenes L. Antille</i>	
ARE OPEN-SOURCE DATA EFFICIENT TO CALIBRATE AN AGRICULTURAL SYSTEM MODEL TO SIMULATE CROP EVAPOTRANSPIRATION AND YIELD IN A DATA-SCARCE REGION? .....	1282
<i>Viveka Nand, Zhiming Qi</i>	
DEVELOPMENT OF A 4-H PROJECT BOOK: READY SET MOW! .....	1303
<i>Forrest M Lang, S. Dee Jepsen</i>	
SEED COATING APPROACH FOR ACHIEVING TIMELY GERMINATION OF COVER CROPS .....	1312
<i>Mastaneh Shokri, Shahab Saedi, Ahmed Abdalla, Yashar Asgarzadeh, Ali Mirzakhani Nafchi</i>	
DEEP-LEARNING-BASED BEHAVIORAL TIME BUDGETS FOR SOWS WITH HIGH AND LOW PIGLET MORTALITY RATES .....	1325
<i>Shifra S. Ferziger, Isabella C. F. S. Condotta, Tami M. Brown-Brandl, Yeyin Shi, Gary A. Rohrer</i>	
A NOVEL AUTOMATED LABOR-SAVING MACHINE FOR CUTTING OFF AND CRUSHING OF OLD STEM IN ASPARAGUS CULTIVATION .....	1332
<i>Chia-Hong Hsiao, Chia-Chun Chien, Jen-Cheng Wang, Ming-Chi Guo, An-Chi Liu, Jui-Chu Peng, Ming-Hsien Hsieh, Cheng-Ying Chou, Joe-Air Jiang</i>	
4D IMAGING FOR FIELD PHENOTYPING USING SPATIOTEMPORAL REGISTRATION OF HIGH-RESOLUTION LIDAR DATA .....	1340
<i>Javier Rodriguez-Sanchez, Kyle Johnsen, Changying Li</i>	
RAPID AND LOW-COST MEASUREMENT METHOD OF NORMALIZED DIFFERENCE VEGETATION INDEX IN DIFFERENT SCENES.....	1354
<i>Di Song, Esther Ngumbi, Mohammed Kamruzzaman</i>	

### VOLUME 3

NOVEL MACHINE LEARNING AND IMAGE PROCESSING METHOD FOR DETECTING SEED GERMINATION .....	1360
<i>Spencer Grant, Jaziel Castaneda, Hamidreza Samouei, Fatemehsadat Tabei, David Parker, Behnam Askarian</i>	
PERFORMANCE EVALUATION OF NEW SPRAYING SYSTEM FOR COTTON DEFOLIATION USING PULSE WIDTH MODULATION TECHNOLOGY AND ROBOTICS IN BLACKVILLE, SOUTH CAROLINA .....	1365
<i>Jyoti Neupane, Joe Mari Maja, Gilbert Miller, Michael Marshall , Matthew A Cutulle, Jun Luo , Edward Barnes</i>	
BLUEBERRY YIELD ESTIMATION THROUGH MULTI-VIEW IMAGERY WITH YOLOV8 OBJECT DETECTION .....	1373
<i>Zhengkun Li, Changying Li, Patricio Munoz</i>	
THREE-VIEW COTTON FLOWER COUNTING THROUGH MULTI-OBJECT TRACKING AND MULTI-MODAL IMAGING.....	1387
<i>Chenjiao Tan, Changying Li, Jin Sun, Huaibo Song</i>	
DESIGN, FABRICATION, AND TEST OF AUTOMATIC ELDERBERRY PROCESSING SYSTEM.....	1401
<i>Sazzad Mahmud Rifat, Jianfeng Zhou, Andrew Thomas</i>	
PEDAL OPERATED ICE CRUSHER FABRICATION AND PERFORMANCE EVALUATION FOR MARGINAL FISH FARMERS IN BANGLADESH.....	1416
<i>Sazzad Mahmud Rifat, Abu Kawsar Ahmed, Muhammad Ashik-E-Rabbani, Md. Samiul Basir, Jianfeng Zhou</i>	
INFLUENCE OF MOISTURE CONTENT ON THE MECHANICAL PROPERTIES OF MAIZE.....	1432
<i>Manuel Moya, David Sanchez, Jose Angel Romero, J. Villar</i>	
ENGINE ENERGY EFFICIENCY USING BIODIESEL MIXTURES OF RESIDUAL OIL AND LPG .....	1440
<i>Diego Jose Carvalho Alonso, Ronald Leite Barbosa, Carlos Eduardo Silva Volpato</i>	
META AG: AN AUTOMATIC CONTEXTUAL AGRICULTURAL METADATA COLLECTION APP.....	1459
<i>Md. Samiul Basir, Yaguang Zhang, Dennis R. Buckmaster, Ankita Raturi, James V. Krogmeier</i>	
USING A MICROWAVE SENSOR TO MONITOR SHRINKAGE WITHIN AN EIGHTH-SCALE GRAIN DRYING SYSTEM IN REAL-TIME.....	1472
<i>Micah A. Lewis, Samir Trabelsi</i>	
SINGLE EFFECT EVAPORATION OF TENDER COCONUT WATER .....	1481
<i>Jerry James M. De La Torre, Ma. Cristina B. Gragasin, Ofero Caparino</i>	
CONTRASTIVE LEARNING FROM MULTIPLE CAMERAS FOR ACCURATE PLANT ORGAN COUNTING.....	1490
<i>Daniel J Petti, Changying Li</i>	
NEW ROBOTIC PLATFORM FOR COTTON HARVESTING .....	1502
<i>Mohd Fazly Mail, Joe Mari Maja, Jyoti Neupane, Matthew Cutulle, Michael Marshall, Gilbert Miller, William Bridges, Edward Barnes</i>	

A NEW LOOK AT SEED AND GRAIN EQUILIBRATION DATA .....	1511
<i>Larry D Howlett</i>	
EVALUATION OF NEURAL NETWORK AND DATA MINING MODELS IN YEARLY RIVER DISCHARGE SIMULATION IN SOUTHWEST IRAN .....	1518
<i>Zohreh Khorsandi Kouhanestani, Farhad Mokhtari, Farzaneh Khorsandi</i>	
DETECTING CARCASS DEFECTS OF NATIVE CHICKENS USING CONVOLUTIONAL NEURAL NETWORKS .....	1521
<i>Pin-Cheng Lai, Yan-Fu Kuo</i>	
DESIGN AND RESEARCH OF SPINNING FISH VACCINE ADSORPTION INJECTION DEVICE .....	1526
<i>Chen Li, Songming Zhu, Jianping Li</i>	
INTEGRAL APPROACH OF UNSUPERVISED LEARNING AND TEMPORAL STABILITY IN IRRIGATION MANAGEMENT .....	1536
<i>Hemendra Kumar, Puneet Srivastava, Jasmeet Lamba, Brenda V. Ortiz, Steve W. Lyon, Bijoychandra S Takhellambam, Guilherme Morata, Luca Bondesan</i>	
IMPROVING IRRIGATION AND DISEASE MANAGEMENT IN IRRIGATED POTATO FIELDS USING IOT-BASED SENSOR TECHNOLOGY .....	1546
<i>Younsuk Dong, Jill Check, Jaime Willbur, Martin Chilvers</i>	
INTEGRATING MACHINE LEARNING INTO PROCESS-BASED MODELING TO PREDICT THE AMMONIA LOSS FROM STORED SLURRY DAIRY MANURE .....	1553
<i>Rana A Genedy, Jactone A Ogejo, Matthias Chung, Julie Shortridge</i>	
ELECTRONIC CONTROL UNIT FOR ELECTRICAL STOP VALVES TO ENABLE THEIR OPERATION USING CONTROLLER AREA NETWORK VIA THE IMPLEMENT BUS OF BOOM SPRAYERS .....	1568
<i>Humphrey H Maambo, Ahmad Al-Mallahi, Travis J Esau</i>	
RISK ASSESSMENT FOR CATTLE STUNNING WORKERS: A CASE STUDY .....	1575
<i>Carlos Ospina, Serap Gorucu, Daniel W. Hofstetter</i>	
PORTABLE MICROSCOPE USED FOR MONITORING PLANT STOMATA VIA MACHINE LEARNING .....	1579
<i>Anthony Nicolaidis, Sunghwan Jung, Rehan Marshall</i>	
SUSTAINABLE PRODUCTION OF XYLO-OLIGOSACCHARIDE FROM RICE HUSK: A TECHNO-ECONOMIC AND ENVIRONMENTAL PERFORMANCE ASSESSMENT .....	1589
<i>Winfred Oppong Yeboah, Ebenezer Miezah Kwofie, Dongyi Wang</i>	
INTEGRATION UAS-IMAGERY AND A COMMERCIAL-SIZE SPRAYER TO IMPLEMENT SITE-SPECIFIC WEED CONTROL IN CORN .....	1633
<i>Yoko Kosugi, David Kramar, Mike Ostlie, Paulo Flores</i>	
OPPORTUNITIES FOR MANURE MANAGEMENT TECHNOLOGIES IN NEW YORK STATE DAIRY FARMS .....	1644
<i>Alessandro Chiumenti</i>	
REAL-TIME AMMONIA MEASUREMENT SYSTEM USING AN ELECTROCHEMICAL SENSOR .....	1651
<i>Myeongseong Lee, Carolina B Brandani, Kevin Jack Bush, Greg B Ferguson, Terra N Campbell, Kenneth D Casey, David B Parker, Jacek A Koziel, David Brauer, Brent W Auvermann</i>	

THE EFFECT OF WATER APPLICATION ON AMMONIA EMISSIONS FROM OPEN-LOT LIVESTOCK-FEEDING SURFACES.....	1659
<i>Myeongseong Lee, Carolina B Brandani, Kevin Jack Bush, Greg B Ferguson, Will Willis, Terra N Campbell, Vinicius Gouvea, Kenneth D Casey, David B Parker, Jacek A Koziel, David Brauer, Brent W Auvermann</i>	
AUTONOMOUS DETECTION AND SEVERITY ESTIMATION OF GRAPEVINE LEAFROLL DISEASE IN THE VINEYARD .....	1667
<i>Ertai Liu, Fernando E Romero Galvan, David Combs, Kathleen Kanaley, Ryan Pavlick, Kaitlin M Gold, Yu Jiang</i>	
IMPACT OF FISSURE CLASSIFICATIONS ON GERMINATION OF RICE SEEDS.....	1674
<i>Samuel O Olaoni, Kaushik Luthra, Griffiths G Atungulu</i>	
VARIABLE RATE APPLICATION IN FRUIT ORCHARDS AND VINEYARDS IN EUROPE: CANOPY CHARACTERIZATION AND SYSTEM IMPROVEMENT .....	1682
<i>Emilio Gil, Javier Campos, Raman Salcedo, Francisco Garcia-Ruiz</i>	
CHARACTERIZING LOGGING TRUCK-RELATED CRASHES IN FLORIDA: 2010 -2021 .....	1690
<i>Madison Moore, Serap Gorucu, Nikolay Bliznyuk</i>	
ANALYSIS OF FARM LABOR TRANSPORT-RELATED CRASHES IN FLORIDA: 2013-2021 .....	1696
<i>Madison Moore, Serap Gorucu, Nikolay Bliznyuk</i>	
ROOT SEGMENTATION OF X-RAY COMPUTED TOMOGRAPHY IMAGES OF CONTAINER HORTICULTURAL PLANTS USING MASK R-CNN AND DBSCAN-BASED 3D POINT CLOUD CLUSTERING .....	1703
<i>Mary Elizabeth Cassity, Paul C Bartley, Yin Bao</i>	
DYNAMIC ELECTRIC CONSUMPTION TRENDS MEASURED IN A BROILER HOUSE IN ARKANSAS .....	1713
<i>Yi Liang, Thomas A. Costello, Michael Janorschke, Chad E. Hayes</i>	
CHARACTERIZATION OF LEAF AZIMUTH ANGLE IN MAIZE PLANTS USING IMPROVED YOLOV5 .....	1721
<i>Weilong He, Joseph Gage, Lirong Xiang</i>	
CALIBRATION OF ALMOND PROPERTIES USING DISCRETE ELEMENT METHOD (DEM) .....	1729
<i>Mohammad A Sadek, Dante S. Panattoni</i>	
SYSTEMATIC PEDAGOGICAL APPROACH FOR ASM CAPSTONE PROJECT AT CAL POLY .....	1739
<i>Mohammad A Sadek</i>	
A GRADUATE-LEVEL FIELD COURSE IN IRRIGATION AND AGRICULTURAL WATER MANAGEMENT FOR AN IMMERSIVE LEARNING EXPERIENCE .....	1744
<i>Derek M. Heeren, Laszlo G. Hayde, Dean E. Eisenhauer, Peter G. McCornick, Ali T. Mohammed, Aaron R. Mittelstet, Alan L. Boldt, Xin Qiao, David M. Mabie, Francisco Munoz-Arriola</i>	
IMPACTS OF DIFFERENT MICROWAVE POWER LEVELS ON ERGOSTEROL AND AFLATOXIN BIOSYNTHESIS BY ASPERGILLUS FLAVUS NRRL 3357.....	1761
<i>Abass Oduola, Burton H Bluhm, Griffiths G. Atungulu</i>	
DEVELOPING EDUCATION, RESEARCH, AND EXTENSION TRAINING ON PRECISION AGRICULTURE PHENOTYPING TOOLS AT HBCU COMMUNITIES .....	1767
<i>Jingqiu Chen, Wei-Zhen Liang, Jian Jin, Violeta M. Tsoleva</i>	



NON-INVASIVE SENSING OF KEY CHEMICAL COMPOSITIONS OF GRAPES.....	1776
<i>Iman Ebrahimi, Ricardo Pinto De Castro, Reza Ehsani, Luca Brillante, Shuang Feng</i>	
PRODUCTION AND CHARACTERIZATION OF MAGNETIC ACTIVATED CARBON FROM CORN AND SOYBEAN CROP RESIDUE TO ESTIMATE EFFICACY FOR WASTEWATER TREATMENT .....	1781
<i>Magdalene K Hoff, Shahab Saedi, Kasiviswanathan Muthukumarappan</i>	
A METHOD TO EVALUATE MILKING EFFICIENCY USING VIDEO CAMERAS .....	1788
<i>Ryan Prendergast, Michael D. Murphy, Fergal Buckley, John Upton</i>	
EVALUATION OF THE IMPLEMENTATION OF AGRICULTURAL SAFETY MATERIALS IN SCHOOL-BASED AGRICULTURAL EDUCATION PROGRAMS .....	1798
<i>Maryann M. Lovern, Hunter F. Massey, Catherine A. Dibenedetto, Aaron P. Turner</i>	
EARLY WARNING SYSTEM FOR OPEN-BEAKED RATIO, SPATIAL DISPERSION, AND MOVEMENT OF CHICKEN USING CNNs.....	1807
<i>Bo-Lin Chen, Yan-Fu Kuo</i>	
ONLINE CALCULATOR TO DETERMINE OPTIMUM OVERLAP FROM PAN TESTS.....	1814
<i>Timothy S Stombaugh, Barry Farmer</i>	
GENERAL MODEL FOR TIRE DEFLECTION.....	1821
<i>Christopher M. Mauldin, Carl D. Crane, John K. Schueller</i>	
EFFECT OF MILKING EFFICIENCY, PARLOR UTILIZATION AND HERD SIZE ON THE ENERGY EFFICIENCY OF IRISH MILKING SYSTEMS.....	1830
<i>Fergal Buckley, Ryan Prendergast, Michael D. Murphy, John Upton</i>	
A POTENTIAL APPROACH TO SELECTING AN APPROPRIATE HERMETIC STORAGE SYSTEM FOR HIGH-VALUE CROPS.....	1840
<i>Nileshwari Raju Yewle, Kishore Chandra Swain, Sandeep Mann</i>	
A NOVEL AI METHOD FOR EFFICIENT AND SUSTAINABLE TOMATO FARMING.....	1852
<i>Spencer Grant, Jaziel Castaneda, Fatemehsadat Tabei, Hamidreza Samouei, David Parker, Behnam Askarian</i>	
APPLICATION OF RADIO FREQUENCY ENERGY TO PRE-HEAT TO COLD WET HIGH DIFFUSION PARTICULATE BIOMASS MATERIAL BEFORE CONVECTION DRYING .....	1857
<i>Christopher Lanning, Shuang Zhang, Ren Yang, James H Dooley, Juming Tang</i>	
USDA-NRCS FINANCIAL ASSISTANCE OBLIGATIONS SUPPORTING ON-FARM ENERGY CONSERVATION .....	1884
<i>Terri L Ruch</i>	
MEASUREMENT OF FUGITIVE EMISSIONS FROM MANURE SPREADING OPERATIONS IN A CONTROLLED ENVIRONMENT.....	1887
<i>Patrick Brassard, Mahsa Baghdadi, Valerie Latourneau, Nathalie Turgeon, Angela Maria Trivino, Laura Daniela Mila, Caroline Duchaine, Stephane Godbout</i>	
PREDICTION OF FIRMNESS OF SWEETPOTATOES USING VNIR HYPERSPECTRAL IMAGING AND MACHINE LEARNING .....	1895
<i>Md. Toukir Ahmed, Yuzhen Lu, Arthur Villordon, Mohammed Kamruzzaman</i>	
DEVELOPMENT AND EVALUATION OF A CONTINUOUS CANOPY SHAKER FOR CALIFORNIA TABLE OLIVES.....	1901
<i>Cristian Manzo, Mohammadmehdi Maharlooeei, Reza Ehsani, Louise Ferguson</i>	

USE OF A TIME-OF-FLIGHT 3D CAMERA FOR REAL-TIME NONPOROUS BULK VOLUME ESTIMATION .....	1908
<i>Connor C. Mullins, Travis J. Esau, Ahmad A. Al-Mallahi, Aitazaz A. Farooque, Qamar U. Zaman</i>	
A DYNAMIC OBJECT COUNTING METHOD FOR STRAWBERRY FRUITS USING VISION TRANSFORMER NETWORKS AND KALMAN FILTER TRACKING .....	1916
<i>Xuehai Xz Zhou, Yuyang Yz Zhang, Shangpeng Sun Ss Sun, Phil Pr Rosenbaum, Mr.</i>	
HOW WILL WE TEACH PROGRAMMING IN A CHATGPT WORLD?.....	1925
<i>Kevin G. Moore, Jeffrey M. Sadler</i>	
NEURAL IMPLICIT REPRESENTATION-BASED TREE CROP PLANT 3D RECONSTRUCTION .....	1931
<i>Tian Qiu, Jonathan Moon, Lailiang Cheng, Kaspar Kuehn, Yu Jiang</i>	
QUANTITATIVE INTENSIVE FOR THE NOT SO MATHEMATICALLY MINDED: PROJECT BASED RESEARCH IN AGRICULTURAL SYSTEMS.....	1944
<i>Michael L. Pate, Bruce Miller, F. Richard Beard, Rhonda Miller, Royce Hatch</i>	
NONTHERMAL MILK PROCESSING AND QUALITY PRESERVATION BY CONTINUOUS LIQUID PLASMA DISCHARGE PROCESS .....	1949
<i>Yuan Yuan, Haiqing Sheng, Shaobo Deng, Md Mokter Hossain, Dinithi Mohotti, Sarah X Wu</i>	
DESTROYING PERFLUOROOCANOIC ACID IN WATER BY CONTINUOUS LIQUID-PHASE PLASMA DISCHARGE.....	1955
<i>Celiannie Rivera, Alia Nasir, Robinson Ndeddy Aka, Shaobo Deng, Sarah X Wu</i>	
UAS AND UGV-BASED DISEASE MANAGEMENT SYSTEM FOR DIAGNOSING CORN DISEASES ABOVE AND BELOW THE CANOPY USING DEEP LEARNING .....	1965
<i>Aanis Ahmad, Varun Aggarwal, Dharmendra Saraswat, Gurmukh S Johal</i>	
EVALUATING A LIQUID-PHASE PLASMA DISCHARGE PROCESS FOR AMMONIA OXIDATION IN WASTEWATER .....	1985
<i>Robinson Ndeddy Aka, Dinithi Mohotti, Alia Nasir, Ekow Agyekum-Oduro, Sarah X Wu</i>	
SENSING STRATEGIES OF CRISPR-BASED BIOSENSOR IN REAL-TIME MONITORING OF NUCLEIC ACID AND NON-NUCLEIC ACID TARGETS: CHALLENGES AND PERSPECTIVES.....	1997
<i>Fei Jia, Yaping Peng, Jingyi Chen, Yanbin Li</i>	
RAMAN ENHANCEMENT EFFECT OF DIFFERENT AU @AG NPS ON E. COLI.....	2016
<i>Yahui Chen, Yankun Peng, Jiewen Zuo, Qinghui Guo, Jianwei Qin</i>	
RAMAN ENHANCEMENT EFFECT OF DIFFERENT AG@AU NANOPARTICLES ON RACTOPAMINE.....	2024
<i>Tianzhen Yin, Yankun Peng, Kuanglin Chao, Jianwei Qin, Qinghui Guo</i>	
THE NEWS MODEL RECOVERY OF NUTRIENTS, ENERGY, AND WATER IN A SUSTAINABLE (NEWS) MANNERRESOURCES FROM ONSITE AND DECENTRALIZED WASTEWATER FACILITIES .....	2031
<i>A. R. Rubin, S. L. Crawford</i>	

## Author Index