

2016 IEEE 36th Central American and Panama Convention (CONCAPAN XXXVI)

**San Jose, Costa Rica
9-11 November 2016**



**IEEE Catalog Number: CFP16COU-POD
ISBN: 978-1-4673-9579-3**

**Copyright © 2016 by the Institute of Electrical and Electronics Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP16COU-POD
ISBN (Print-On-Demand):	978-1-4673-9579-3
ISBN (Online):	978-1-4673-9578-6

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
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

DESIGN AND CONSTRUCTION OF A HYDRO-PNEUMATIC MOCK CIRCULATION LOOP THAT EMULATES THE SYSTEMIC CIRCUIT OF THE CIRCULATORY SYSTEM.....	1
<i>Marta Vilchez-Monge ; Alejandro Truque-Barrantes ; Gabriela Ortiz-Leon</i>	
COMBINATORIAL METAHEURISTICS APPLIED TO INFECTIOUS DISEASE MODELS	7
<i>Juan José Fallas-Monge ; Jeffry Chavarría-Molina ; Geisel Alpiñar-Brenes</i>	
MANUFACTURING OF ALL-FIBER Q-SWITCH LASERS FOR SUPERCONTINUUM GENERATION.....	13
<i>J. Cascante-Vindas ; F. Siles ; A. Díez ; M. V. Andrés</i>	
AUTOMATIC DISCRIMINATION OF COSTA RICAN STINGLESS BEES BASED ON MODIFIED SIFT OF ITS WINGS	19
<i>Juan Pablo Prendas Rojas ; Melvin Ramirez Bogantes ; Ingrid Aguilar Monge ; Geovannie Figueroa Mata ; Carlos Travieso Gonzalez ; Eduardo Herrera Gonzalez</i>	
A COMPARISON OF BIO-INSPIRED OPTIMIZATION METHODOLOGIES APPLIED TO THE TUNING OF INDUSTRIAL CONTROLLERS.....	25
<i>Macarena Céspedes ; Mónica Contreras ; Joaquín Cordero ; Gustavo Montoya ; Karen Valverde ; José David Rojas</i>	
ON THE SIGNIFICANCE OF LEAF SIDES IN AUTOMATIC LEAF-BASED PLANT SPECIES IDENTIFICATION.....	31
<i>Jose Carranza-Rojas ; Erick Mata-Montero</i>	
BIOCOMPUTING PLATFORM MODULE FOR CANCER GENOMICS AND CHEMOTHERAPY	37
<i>J. C. Coto ; F. Siles ; R. Mora-Rodríguez</i>	
IMPROVING THE TEMPORAL SEGMENTATION IN DIGITAL VIDEOS USING THE DECEIVED BILATERAL FILTER	43
<i>Rodrigo Chacón-Quesada ; Saúl Calderón-Ramírez ; F. Siles</i>	
A FIRST GLANCE ON THE ENHANCEMENT OF DIGITAL CELL ACTIVITY VIDEOS FROM GLIOBLASTOMA CELLS WITH NUCLEAR STAINING.....	49
<i>Saúl Calderón ; Daniel Moya ; Juan Carlos Cruz ; Juan Manuel Valverde</i>	
USING IOT RESOURCES TO ENHANCE THE ACCURACY OF OVERDRAIN MEASUREMENTS IN GREENHOUSE HORTICULTURE	55
<i>Arys Carrasquilla-Batista ; Alfonso Chacón-Rodríguez ; Milton Solórzano-Quintana</i>	
CHARACTERIZATION OF HETEROGENEOUS RESPONSE TO CHEMOTHERAPY BY PERTURBATION-BASED MODELING OF FLUORESCENT SPHINGOLIPID METABOLISM IN CANCER CELL SUBPOPULATIONS.....	60
<i>Ra Mora-Rodríguez ; Ja Molina-Mora</i>	
IDENTIFICATION OF CANCER CHEMOSENSITIVITY BY ODE AND GMM MODELING OF HETEROGENEOUS CELLULAR RESPONSE TO PERTURBATIONS IN FLUORESCENT SPHINGOLIPID METABOLISM.....	67
<i>Ja Molina-Mora ; Ra Mora-Rodríguez</i>	
A BIOCOMPUTATIONAL PLATFORM FOR THE AUTOMATED CONSTRUCTION OF LARGE-SCALE MATHEMATICAL MODELS OF MIRNA-TRANSCRIPTION FACTOR NETWORKS FOR STUDIES ON GENE DOSAGE COMPENSATION.....	73
<i>Acón Man-Sai ; Siles-Canales Francisco ; Ra Mora-Rodríguez</i>	
A BIOCOMPUTATIONAL APPLICATION FOR THE AUTOMATED CONSTRUCTION OF LARGE-SCALE METABOLIC MODELS FROM TRANSCRIPTOMIC DATA.....	80
<i>Baez-Villalobos Edwin ; Siles-Canales Francisco ; Mora-Rodríguez Ra</i>	
AN EMBEDDED SYSTEM FOR THE DETECTION OF ILLEGAL HUNTING AND LOGGING.....	86
<i>Jordan Montero-Aragón ; Carlos Salazar-García ; Reinaldo Castro-Gonzalez ; Jorge Cárdenas-Reyes ; Alfonso Chacon-Rodríguez ; Pablo Alvarado-Moya</i>	
FINITE ELEMENT ANALYSIS OF MEMS FLEXIBLE PRESSURE SENSOR FOR TOTAL ANKLE REPLACEMENT	91
<i>Marco V. Bedoya Serrano ; Paola Vega-Castillo</i>	
A SOFTWARE CONTROLLED HARDWARE ACCELERATION ARCHITECTURE FOR IMAGE PROCESSING USING AN EMBEDDED DEVELOPMENT BOARD.....	97
<i>Mauricio Paz Valverde ; Jeferson González</i>	
HIGH & LOW-LEVEL FEATURES MODELLING OF NODES IN WSNS USING SYSTEMC	102
<i>Josie E. Rodriguez Condia ; Wilson Javier Perez Holguin</i>	

IMPLEMENTATION OF AN OPEN CORE IEEE 754-BASED FPU WITH NON-LINEAR ARITHMETIC SUPPORT	108
<i>Adrian Cervantes ; Francis Lopez ; Jeffry Quiros ; Diego Rodriguez ; Carlos Salazar-Garcia ; Carlos Meza ; Alfonso Chacon-Rodriguez</i>	
REVIEW OF CMOS CIRCUIT ARCHITECTURES FOR ELECTRICAL IMPEDANCE SPECTROSCOPY	114
<i>Ronny Garcia-Ramirez ; Oscar Villalta-Gutierrez ; Renato Rimolo-Donadio</i>	
EVALUATION OF VECTOR FITTING FOR COMPACT INTERCONNECT MODEL REPRESENTATION	120
<i>Luis Ernesto Carrera-Retana ; Renato Rímolo-Donadio ; Christian Schuster</i>	
PRACTICAL DESIGN CONSIDERATIONS FOR AN ALL-DIGITAL PLL IN A DIGITAL CAR RADIO RECEPTION SOC	126
<i>Alexander Mora Sánchez ; Ulrich Moehlmann ; Peter Blinzer ; Martin Ehlert</i>	
REAL-TIME VIBRATION ANALYSIS FOR STRUCTURE FAULT DETECTION	131
<i>Yeiner Arias-Esquivel ; Carlos Salazar-García ; Jeferson González-Gómez</i>	
AN EMPIRICAL EVALUATION OF NASA-MDP DATA SETS USING A GENETIC DEFECT-PRONENESS PREDICTION FRAMEWORK	135
<i>Juan Murillo-Morera ; Christian Quesada-López ; Carlos Castro-Herrera ; Marcelo Jenkins</i>	
COSMIC BASE FUNCTIONAL COMPONENTS IN FUNCTIONAL SIZE BASED EFFORT ESTIMATION MODELS	141
<i>Christian Quesada-López ; Juan Murillo-Morera ; Carlos Castro-Herrera ; Marcelo Jenkins</i>	
COMPUTER FORENSICS	147
<i>Carlos López Grande ; Ricardo Salvador Guadrón</i>	
BUSINESS INTELLIGENCE MODEL TO SUPPORT A JUDGE'S DECISION MAKING ABOUT LEGAL SITUATIONS	153
<i>Luis Raúl Rodríguez Oconitrillo ; Alvaro De La Ossa Osegueda</i>	
LOW-COST INTERNET MESH NETWORKS FOR PUBLIC RURAL SCHOOLS	158
<i>Martínez-Cruz Carlos Eugenio</i>	
PENTESTING ON WEB APPLICATIONS USING ETHICAL - HACKING	164
<i>Rina Elizabeth López De Jiménez</i>	
RADIO COMMUNICATION RANGE EFFECTS ON A FLAT WIRELESS SENSOR NETWORK PERFORMANCE	170
<i>Majid Bayani ; Yesica Alpizar ; Rebeca Gamboa ; Isaac Ulate ; Oscar Ramírez</i>	
A WEB PAGE DESIGN FOR MONITORING ELECTROMAGNETIC POLLUTION IN A SMART CITY	180
<i>M. Vizcaya ; F. Felipe-Duran ; E. Acevedo-Mosqueda ; M. Sanchez-Meraz ; M. Acevedo Mosqueda</i>	
EXPERT SYSTEM FOR THE DIAGNOSIS OF VERTEBRAL COLUMN DISEASES	184
<i>Elena Acevedo ; Antonio Acevedo ; Federico Felipe ; Pedro Avilés</i>	
DESIGN, DEVELOPMENT AND VALIDATION OF A MOBILE APPLICATION FOR GOAL SETTING AND SELF-MONITORING OF DIETARY BEHAVIORS	188
<i>Christian Quesada-López ; Melissa L. Jensen ; Giselle Zuñiga ; Anne Chinnock ; Marcelo Jenkins</i>	
AUDITORY IMAGERY CLASSIFICATION WITH A NON-INVASIVE BCI	194
<i>Melissa González ; Lochi Yu</i>	
FROM PIXEL TO VOXEL IN THE CLINICAL DIAGNOSIS	198
<i>José Miguel Lázaro Guevara ; Dirk R. Albrecht</i>	
DEVELOPMENT OF TECHNOLOGY AND ENGINEERING: CASES OF STUDY OF THE BIOINFORMATICS AND BIOLOGY SYSTEMS MASTER'S DEGREE IN COSTA RICA	203
<i>Vanesa Mora Hernández ; Federico Matarrita ; José Molina Mora ; Luis Rojas Matey ; Eduardo Quiros ; Man Sai ; Edwin Báez ; Luis Ruiz ; Ricardo Boza ; Allan Orozco</i>	
USING A PROGRAMMABLE NETWORK SWITCH TCAM TO FIND THE BEST ALIGNMENT OF TWO DNA SEQUENCES	208
<i>Diego Valverde Garro ; Claudio Viquez Calderón ; Christopher Simon Yeung</i>	
PRODUCTION OF FARNESENE FROM AGRO-INDUSTRIAL WASTE BY SYNTHETIC BIOLOGY	213
<i>David García-Gómez ; Silver Ceballos-Valenciano ; Karla Valerín-Berrocal ; Karol Jiménez-Quesada ; Giovanni Garro-Monge</i>	
BIOINFORMATICS AND COMPUTATIONAL BIOLOGY SYSTEMS DESIGN APPLIED TO NANOBIOTECHNOLOGY	218
<i>José Valverde ; Allan Orozco</i>	
AUTOMATIC DETECTION OF PNEUMONIA ANALYZING ULTRASOUND DIGITAL IMAGES	222
<i>Ronald Barrientos ; Avid Roman-Gonzalez ; Franklin Barrientos ; Leonardo Solis ; Malena Correa ; Monica Pajuelo ; Cynthia Anticona ; Roberto Lavarello ; Benjamin Castañeda ; Richard Oberhelman ; William Checkley ; Robert H. Gilman ; Mirko Zimic</i>	

FILTERING OF THE SKIN PORTION ON LUNG ULTRASOUND DIGITAL IMAGES TO FACILITATE AUTOMATIC DIAGNOSTICS OF PNEUMONIA	226
<i>Franklin Barrientos ; Avid Roman-Gonzalez ; Ronald Barrientos ; Leonardo Solis ; Alicia Alva ; Malena Correa ; Monica Pajuelo ; Cynthia Anticona ; Roberto Lavarello ; Benjamin Castañeda ; Richard Oberhelman ; Robert H. Gilman ; Mirko Zimic</i>	
KINEMATICS AND JACOBIAN ANALYSIS OF A 6UPS STEWART-GOUGH PLATFORM	230
<i>Manuel Cardona</i>	
SUGAR CRYSTALS CHARACTERIZATION FOR QUALITY CONTROL INSPECTION USING DIGITAL IMAGE PROCESSING	236
<i>Manuel Cardona</i>	
PERFORMANCE ANALYSIS OF A BATTERY CHARGER WITH BQ24650	242
<i>Diego Armando Toledo Ortiz ; L. G. Gonzalez ; O. Carranza ; Remigio Guevara Baculima</i>	
INTRODUCING RELIABILITY APPLICATIONS FOR SCHEDULED OUTAGES IN COSTA RICA USING MONTE CARLO METHODS	247
<i>Marva Mason ; Leonardo Montealegre ; Alejandro Zuniga</i>	
INTRODUCING SATURATION CHARACTERISTIC FITTING TECHNIQUES FOR POWER TRANSFORMERS IN THE COSTA RICAN ELECTRICAL NETWORK	253
<i>Jorge Navarro ; Leonardo Montealegre ; Gustavo Gomez</i>	
ECONOMIC DISPATCH FOR OPTIMAL MANAGEMENT OF ISOLATED MICROGRIDS.....	259
<i>Jacqueline Llanos Proaño ; Diego Ortiz Villalba ; Doris Saez ; Daniel Olivares Quero</i>	
IDENTIFICATION OF COSTLY CONTINGENCIES BY TRANSIENT STABILITY-CONSTRAINED OPTIMAL POWER FLOW	265
<i>R. Funes ; E. Barocio ; Ramon J. Betancourt ; J. J. Ramos ; I. Reyes</i>	
METHODOLOGY FOR THE REGISTRATION OF TRANSIENT OVERVOLTAGES IN LOW-VOLTAGE NETWORKS	271
<i>Andrés Alfonso ; Luis E. Perdomo ; Francisco Santamaria</i>	
FIXED PHOTOVOLTAIC SYSTEM OPTIMIZATION: AZIMUTH, INCLINATION AND PITCH CASE STUDY AT LIBERIA	277
<i>Isaac Rojas-Hernández</i>	
STATISTICAL ANALYSIS OF RESIDENTIAL HARMONIC SPECTRUM IN COSTA RICA.....	283
<i>R. González ; A. Argüello ; J. Quirós-Tortós ; G. Valverde</i>	
STATISTICAL ANALYSIS OF RESIDENTIAL DEMAND BEHAVIOR IN COSTA RICA: CREATION OF LOAD PROFILES	289
<i>J. Quirós-Tortós ; A. Arguello ; G. Valverde</i>	
DEVELOPING AUTOMATED HARDWARE-IN-THE-LOOP TESTS WITH RTDS FOR VERIFYING THE PROTECTIVE RELAY PERFORMANCE	295
<i>R. Iracheta-Cortez ; N. Flores-Guzman</i>	
IMPACT OF INCREASING ELECTRICITY GENERATION BASED ON WIND ENERGY IN THE WHOLESALE ELECTRICITY MARKET OF THE DOMINICAN REPUBLIC	304
<i>A. M. Cuevas ; D. A. Castillo ; J. R. Jorge ; M. A. Domínguez ; R. I. Núñez ; W. Then</i>	
IMPACT OF INCREASED PENETRATION OF LARGE-SCALE PV GENERATION ON SHORT-TERM STABILITY OF POWER SYSTEMS.....	310
<i>M. D. Baquedano-Aguilar ; D. G. Colomé ; E. Agüero ; M. G. Molina</i>	
MODEL COMPARISON OF VOLTAGE-CURRENT RELATION FOR IONIZED SOILS PRODUCED BY LIGHTNING IMPULSE CURRENT	316
<i>Angie R. Ramos ; Carlos A. Bernal ; Herbert E. Rojas</i>	
COMPARISON OF SYNCHRONIZATION TECHNIQUES FOR A GRID-TIED PHOTOVOLTAIC SYSTEM.....	322
<i>Alonso De Jesús Chica Leal ; César Leonardo Trujillo Rodríguez ; Francisco Santamaria</i>	
POWER TRANSFORMER DEMAGNETIZATION.....	327
<i>Diego M. Robalino</i>	
Author Index	