2013 International Green Computing Conference

(IGCC 2013)

Arlington, Virginia, USA
27-29 June 2013

IEEE

IEEE Catalog Number: CFP1328K-POD
ISBN: 978-1-4799-0621-5

2013 International Green Computing Table of Contents

Paper Title		Author(s)
Energy-Optimized Dynamic Deferral of Workload for Capacity Provisioning in Data Centers	1	Muhammad Abdullah Adnan, Ryo Sugihara, Yan Ma and Rajesh Gupta
Local Power Distribution with Nanogrids: A Position Paper	11	Bruce Nordman and Ken Christensen
Distributed Resource Management in Data Center with Temperature Constraint	19	Mohammad Islam, Shaolei Ren, Niki Pissinou, Hasan Mahmud and Athanasios Vasilakos
Granular CPU Power Measurement for Network HPC Clusters	29	*David Newsom, Ahmad Anbar, Tarek El-Ghazawi and Sardar Azari*
Energy-Aware Checkpointing of Divisible Tasks with Soft or Hard Deadlines	35	Guillaume Aupy, Anne Benoit, Rami Melhem, Paul Renaud-Goud and Yves Robert
Towards an Architecture for Integrated Gas District Cooling with Data Center Control to Reduce CO_2 Emission	43	Jun Okitsu, Ken Naono, Mohd Fatimie Irzaq Khamis, Ahmad Abba Haruna and Nordin Zakaria
A Case Study of Energy Optimization in Monroe Water Distribution System	53	*Fatemeh Alighalehbabakhani, Carol J. Miller, Shawn McElmurry and Seyed Mohsen Sadatiyan Abkenar*
Optimizing Pumping System for Sustainable Water Distribution Network by Using Genetic Algorithm	58	*Seyed Mohsen Sadatiyan Abkenar, Samuel Dustin Stanley, Donald Chase, Carol Miller and Shawn P. McElmurry*
A Smart-Phone Application for Home Emissions Estimates	64	*Guoyao Xu, Michelle Rogers, Carol Miller, Shawn McElmurry, Weisong Shi, Caisheng Wang, Yang Wang and Cheng-Zhong Xu*
Effect of Climatic Conditions on Energy Consumption in Direct Fresh-Air Container Data Centers	70	Hiroshi Endo, Hiroyoshi Kodama, Hiroyuki Fukuda, Toshio Sugimoto, Takeshi Horie and Masao Kondo
Implementing Green Technologies and Practices in High Performance Computing Center	80	Jay Patel, Salvatore Guercio, Andrew Bruno, Matthew Jones and Thomas Furlani
Management of Large-Scale Wireless Sensor Networks Utilizing Multi-Parent Recursieve Area Hierarchies	88	*Johnathan Cree and Jose Delgado-Frias*
Classification of Sidewalks in Street View Images	94	Virginia Smith, Jitendra Malik and David Culler
Drowsy Cache Partitioning for Reduced Static and Dynamic Energy in the Cache Hierarchy	100	*Brendan Fitzgerald, Sonia Lopez Alarcon and Julio Sahuquillo*
Distributed Battery Control for Peak Power Shaving in Datacenters	106	Baris Aksanli, Eddie Pettis and Tajana Simunic Rosing
Smart Proxying: An Optimal Strategy for Improving Battery Life of Mobile Devices	114	Raffaele Bolla, Maurizio Giribaldi, Rafiullah Khan and Matteo Repetto
HomeSim: Comprehensive, Smart, Residential Energy Simulation and Scheduling	120	Jagannathan Venkatesh, Baris Aksanli, Tajana Rosing, Jean-Claude Junqua and Philippe Morin
Online System for Energy Assessment in Large Facilities – Methodology and a Real-World Case Study	128	Venkata Ramakrishna P, Gollakota Kaushik, K Loknath Sudhakar, Geetha Thiagarajan and Anand Sivasubramaniam

Improving Linearity in Class-AB Power Amplifiers Using a Body-Biased NMOS Predistortion Stage 137 — Hooman Rashtian & Shahriar Mirabbasi
Ocelot: A Wireless Sensor Network and Computing Engine with Commodity Palmtop Computers 143 — Haifeng Xu, Alex Jones, Laura Schaefer, Amy Landis and Melissa Bilec
An Efficiency Enhancement Technique for CMOS Rectifiers with Low Start-Up Voltage for UHF RFID Tags 151 — *Pouya Kamalinejad, Kamyar Keikhosravy, Shahriar Mirabbasi and Victor C.M. Leung*
Temperature Effects on On-Chip Energy Measurements 157 — *Juan M Cebrian and Lasse Natvig*
PowerInsight - A Commodity Power Measurement Capability 163 — *James Laros, Phil Pokorny and David Debonis*
Energy Management of Standby-Sparing Systems for Fixed-Priority Real-Time Workloads 169 — Mohammad Haque, Hakan Aydin and Dakai Zhu
Auto-Tuning Multi-Programmed Workload on the SCC 179 — *Brian Roscoe, Mathias Herlev and Chen Liu*
Statistical Modeling of Power/Energy of Scientific Kernels on a Multi-GPU System 184 — *Sayan Ghosh, Sunita Chandrasekaran and Barbara Chapman*
Power and Energy Characteristics of MapReduce Data Movements 190 — Thomas Wirtz, Rong Ge, Ziliang Zong and Zizhong Chen
Energy Conservation in Asynchronous Systems Using Self-Adaptive Fine-Grain Voltage Scaling 197 — Vishal Gupta and Montek Singh
Vector Repacking Algorithms for Power-Aware Computing 205 — *Mario Consuegra, Giri Narasimhan and Raju Rangaswami*
Optimizing Water Distribution System Storage and Its Influences on Pollutant Emission Reduction 213 — *Steven Jin, Carrie Loya-Smalley and Awni Qaqish*
Energy-Efficient Resource Management of Cloud Datacenters Under Fault Tolerance Constraints 219 — Seyed Mohammad Ghoreyshi
Energy Modeling of Supercomputers and Large-Scale Scientific Applications 225 — Scott Pakin and Michael Lang
The CÆSARA Architecture for an Energy and Thermal-Aware Placement of Virtual Machines 231 — Daniel Versick and Djamshid Tavangarian
Joint Management of Data Centers and Electric Vehicles for Maximized Regulation Profits 237 — Marco Brocanelli, Sen Li, Xiaorui Wang and Wei Zhang
Green Computing: A Life Cycle Perspective 247 — Alex Jones, Liang Liao, William Collinge, Haifeng Xu, Laura Schaefer, Amy Landis and Melissa Bilec
Eco-Threading Framework for Commodity Platform 253 — Shouta Nagashima and Shigeru Kusakabe
Evaluating Effects of Thermal Management in Wireless NoC-Enabled Multicore Architectures 259 — Jacob Murray, Paul Wettin, Partha Pande, Behrooz Shirazi, Nishad Nerurkar and Amlan Ganguly
REMEDIATE: A Scalable Fault-Tolerant Architecture for Low-Power NUCA Cache in Tiled CMPs 267 — Abbas Banaiyanmofrad, Houman Homayoun, Vasileios Kontorinis, Dean Tullsen and Nikil Dutt
Automatic Estimation of DVFS Potential 277 — Nicolas Triquenaux, Alexandre Laurent, Benoît Pradelle, Jean Christophe Beyler and William Jalby
Application Specific Low Leakage Data Cache for Embedded Processors 283 — Mostafa Farahani, Fatemeh Eslami and Amirali Baniasadi

Providing Green SLAs in High Performance Computing Clouds 289 — Md E. Haque, Kien Le, Inigo Goiri, Ricardo Bianchini and Thu D. Nguyen
Is There Always Abundant Green Power? A Step Before Geographical Load Balancing for Renewable Energy 300 — Chuansheng Dong, Fanxin Kong, Xue Liu and Haibo Zeng
EnergyAudit: Monitoring Power Consumption in Diverse Network Environments 308 — Joseph Chabarek and Paul Barford
Your Cluster is Not Power Homogeneous: Take Care When Designing Green Schedulers 318 — Mohammed El Mehdi Diouri, Olivier Glück, Laurent Lefèvre and Jean-Christophe Mignot

Introducing FIRESTARTER: A Processor Stress Test Utility 328 — Daniel Hackenberg, Roland Oldenburg, Daniel Molka and Robert Schöne
Locality Aware Power Optimization and Measurement Methodology for PGAS Workloads 337 — David Newsom, Ahmad Anbar, Tarek El-Ghazawi and Sardar Azari
A Power-Aware Multi Harvester Power Unit with Hydrogen Fuel Cell for Embedded Systems in Outdoor Applications 347 — Michele Magno, Danilo Porcarelli, Davide Brunelli and Luca Benini

Energy-Efficient Content Delivery Networks Using Cluster Shutdown 353 — Vimal Mathew, Ramesh Sitaraman and Prashant Shenoy
Towards Green GPUs: Warp Size Impact Analysis 363 — Ahmad Lashgar, Amirali Baniasadi and Ahmad Khonsari
Empirical Characterization and Modeling of Electrical Loads in Smart Homes 369 — Sean Barker, Sandeep Kalra, David Irwin and Prashant Shenoy
Dynamic Task Graph Scheduling on Multicore Processors for Performance, Energy, and Temperature Optimization 379 — *Hafiz Fahad Sheikh and Ishfaq Ahmad*
A Distributed File System for Intermittent Power 385 — *Navin Sharma, David Irwin and Prashant Shenoy*
Energy Cost Optimization in Water Distribution Systems using Markov Decision Processes 395 — *Paulo Fracasso, Frank Barnes and Anna Costa*
Energy-Efficient Server Consolidation for Multi-Threaded Applications in the Cloud 401 — Can Hankendi and Ayse Coskun
Energy-Aware Task Replication to Manage Reliability for Periodic Real-Time Applications on Multicore Platforms 409 — Mohammad Haque, Hakan Aydin and Dakai Zhu
Enabling Advanced Environmental Conditioning with a Building Application Stack 420 — Jay Taneja, Andrew Krioukov, Stephen Dawson-Haggerty and David Culler
Trends in Energy-Efficient Computing: A Perspective from the Green500 430 — Balaji Subramaniam, Tom Scogland and Wu-Chun Feng
Optimizing Communication and Cooling Costs in HPC Data Centers via Intelligent Job Allocation 438 — Fulya Kaplan, Jie Meng and Ayse K. Coskun
Power-Saving in Storage Systems for Internet Hosting Services with Data Access Prediction 448 — Jumpei Okoshi, Koji Hasebe and Kazuhiko Kato
Adapting Data Quality with Multihop Routing for Energy-Harvesting Wireless Sensor Networks 458 — Nga Dang, Mahnaz Roshanaei, Eli Bozorgzadeh and Nalini Venkatasubramanian