Systematic Literature Review

Done on ACM

AllField:(Title:"Energy" AND (Title: "consumption" OR Title: "performance" OR Title: "efficiency") AND

(AllField:("software") OR

AllField:(”program”) OR

AllField:(”programming”) OR

AllField:(“programming languages”) OR AllField:(”framework”)) AND

(AllField:(“benchmark”) OR

AllField:(”benchmarking”)))

Dates: 2016-2022

Research articles

Results: 132

**Paper1: Energy Efficiency across Programming Languages**

**Benchmarks:** The Computer Language Benchmarks Game (CLBG)

**Tools:** Running Average Power Limit (RAPL) tool, jRAPL

**Context**: Performance of programming languages

**OS:** Linux Ubuntu Server 16.10 operating system, kernel version 4.8.0-22-generic, with 16GB of RAM, a Haswell Intel(R) Core(TM) i5-4460 CPU @ 3.20GHz.

**Paper2: Evaluation of the impact on energy consumption of lazy versus strict evaluation of Haskell data-structures**

**Benchmarks:** micro-benchmarks ( benchmark website no longer available)

**Tools:** RAPL

**Context:** Energy consumption of benchmarks

**OS:** Linux

**Paper3: Benchmarking OpenCL, OpenACC, OpenMP, and CUDA: Programming Productivity, Performance, and Energy Consumption**

**Benchmarks:**

* Rodinia benchmark
* four well-known programming frameworks for heterogeneous systems: OpenMP, OpenACC, Open-CL, and CUDA
* SPEC Accel: <https://www.spec.org/accel/> (cost)

**Tools:** MeterPU and x-MeterPU

**Context:** Parallel programming languages

**OS:** Linux

**Paper4: Slim NoC: A Low-Diameter On-Chip Network Topology for High Energy Efficiency and Scalability**

**Benchmarks:** LINPACK benchmark, PARSEC/SPLASH benchmark

**Tools:** estimate general power consumption using the DSENT tool

Reference of tool: C.Sun,C.O.Chen,G.Kurian,L.Wei,J.E.Miller,A.Agarwal,L.Peh,andV.Sto-  
janovic. DSENT - A Tool Connecting Emerging Photonics with Electronics for  
Opto-Electronic Networks-on-Chip Modeling. NOCS, 2012.

**Context:** Network performance evaluation, Parallel architectures

**OS:** Networking hardware

**Paper5: Measuring and Benchmarking Power Consumption and Energy Efficiency**

**Benchmarks:** SPECpower\_ssj2008

**Tools:** SPEC Server Efficiency Rating Tool (SERT) (developed in this paper)

**Context:** Development of the SERT tool, PTDaemon power measurement tool

**OS:** 64-bit Windows and Linux on x86 processors

**Paper6: The Influence of the Java Collection Framework on Overall Energy Consumption**

**Benchmarks:** Java Collections: <https://github.com/greensoftwarelab/Collections-Energy-Benchmark>

**Tools:** RAPL, jRAPL

**Context:** energy optimization approach for Java programs

**OS:** Linux 3.13.0-74-generic operating system, 8GB of RAM, and Intel(R) Core(TM) i3-3240 CPU @ 3.40GHz

**Paper7: Taming Energy Consumption Variations in Systems Benchmarking**

**Benchmarks:** NAS Parallel Benchmarks

**Tools:** RAPL, PowerInsight and BGQ EMON, PowerAPI

**Context:** parallelization (because NAS benchmark)

**OS:** Linux (Debian)

**Paper8: Decoupling Address Generation from Loads and Stores to Improve Data Access Energy Efficiency**

**Benchmarks**:

* MiBench benchmark
* automotive: bitcount, qsort, susan
* consumer: jpeg, tiff
* network: dijkstra, patricia
* office: ispell, stringsearch blowfish, rijndael, pgp, sha
* telecom: adpcm, CRC32, FFT, GSM

**Tools:** Not found

**Context:** Compilers

**OS:** Not found

**Paper9: Energy Eficiency Analysis of Compiler Optimizations on the SPEC CPU 2017 Benchmark Suite**

**Benchmarks:** SPEC CPU 2017

**Tools:** SPEC PTDaemon tool

**Context:** Compilers analysis

**OS:** SUSE Linux

**Paper10: Data Dependent Energy Modeling for Worst Case Energy Consumption Analysis**

**Benchmarks:** BEEBS (fdct and matmult-int)

**Tools:** Physical hardware

**Context:** embedded processors

**OS:** no OS

**Paper11: Data-Driven Benchmarking of Building Energy Performance at the City Scale**

Not relevant (no benchmarks and tools)

**Paper12: Awakening Awareness on Energy Consumption in Software Engineering**

**Benchmarks:** not found

**Tools:** Windows Performance Monitor

**Context:** ?

**OS:** Windows

**Paper13: A Study on the Energy Consumption of Android App Development Approaches**

**Benchmarks:** Rosetta Code, The Computer Language Benchmark Game

**Tools:** Project Volta

**Context:** mobile development

**OS:** Android

**Paper14: Methods for Quantifying Energy Consumption in TPC-H**

**Benchmarks:** Transaction Processing Performance Council (TPC), SPECpower\_ssj2008

**Tools:** TPC-Energy Measurement System (EMS) (package), power meter (physical)

**Context:** Database performance evaluation

**OS:** Not mentioned

**Paper15: Measuring the Energy Efficiency of Transactional Loads on GPGPU**

**Benchmarks:** SPECpower\_ssj2008

**Tools:** Server Efficiency Rating Tool (SERT)

**Context:** analyze performance of graphic processors

**Paper16: Reducing energy consumption of resource-intensive scientific mobile applications via code refactoring**

**Benchmarks:** Not found

**Tools:** No

Not what is needed!

**Paper17: Analysis of Energy Consumption in a Precision Beekeeping System**

Not based on computer performance!

**Paper18: PETRAS: Performance, Energy and Thermal Aware Resource Allocation and Scheduling for Heterogeneous Systems**

**Benchmark:** Rodinia 3.0

**Tools:** lm\_sensors application (Linux monitoring sensors)

**Context:** parallel processing

**OS:** Linux

**Paper19: Evaluating the Impact of Java Virtual Machines on Energy Consumption**

Benchmarks: taken from [OpenBenchmarking.org](http://openbenchmarking.org)

* Includes 5 acknowledged benchmarks from DACAPO benchmark suite v.9.12
  + Avrora
  + H2
  + Lusearch
  + Sunflow
  + PMD
* proven to be accurate for memory management and computer architecture communities
* 7 additional benchmarks from the Renaissance benchmark suite
  + ALS
  + Dotty
  + Fj-kmeans
  + Neo4j
  + Philosophers
  + Reaction
  + Scrabble

**Tools:** RAPL, jRAPL

**Context:** performance of benchmarks

**OS:** Linux

**Paper20: Future of Mobile Software for Smartphones and Drones: Energy and Performance**

**Benchmarks:** micro-benchmarks ( implemented but not much information)

**Tools:** PowerTutor and Dumpsys, Monsoon power meter

**Context:** mobile energy efficiency

**OS:** Android

**Paper21: Beyond Energy-Efficiency: Evaluating Green Datacenter Applications for Energy-Agility**

Not relevant

**Paper22: Dataflow based Near Data Computing Achieves Excellent Energy Efficiency**

Benchmarks: HiBench, PUMA, Rodinia, SPEC, MiBench

Tools: Intel Performance Counter Monitor tools

OS: Not mentioned

**Paper23: Performance and Energy Efficiency of Big Data Systems: Characterization, Implication and Improvement**

**Benchmarks:** BigDataBench (open source)

**Tools:** Perf

**Context:** Big data systems performance

**OS:** Linux

**Paper24: Profiling Energy Consumption in Distributed Simulations**

**Benchmarks:** android app (developed)

**Tools:** Trepn Profiler, Monsoon power meter

**Context:** Profiling tool

**OS**: Android Lollipop

**Paper25: Software Controlled Clock Modulation for Energy Efficiency Optimization on Intel Processors**

Not relevant

**Paper26: A Framework Exploiting Process Variability to Improve Energy Efficiency in FPGA Applications**

**Benchmarks:** FIR and FFT “benchmarks”

**Tools:** no

**Context:** FPGA Applications

**OS:** not found

**Paper27: Less is More: Exploiting the Standard Compiler Optimization Levels for Better Performance and Energy Consumption**

**Benchmarks:** BEEBS benchmark

**Tools:** MAGEEC board together with the pyenergy firmware and host-side software

**Context:** Compilers

**OS:** not found

**Paper28: An empirical survey of performance and energy efficiency variation on Intel processors**

**Benchmarks:** NAS Parallel Benchmark Suite, STREAM, Firestarter, Prime95 and DGEMM

**Tools:** RAPL, libPowerMon[14] with msr-safe (libraries)

**Context:** energy efficiency variation on Intel processors

**OS:** Linux

**Paper29: Harnessing Energy Efficiency of Heterogeneous-ISA Platforms**

**Benchmarks:** Parsec, NPB benchmark

**Tools:** developed by the author and PAPI

**Context:** Heterogeneous (hybrid) systems, parallel computing

**OS:** Intel Xeon E5-1650 v2 (x86 64) and Ap- plied Micro X-Gene 1 (aarch64) machines (Linux)

**Paper30: Adaptive and Polymorphic VLIW Processor to Optimize Fault Tolerance, Energy Consumption, and Performance**

**Benchmarks:** WCET and Powerstone

**Tools:** not found

**Context:** Adaptive processor

**Paper31: Hadoop Energy Consumption Reduction with Hybrid HDFS**

**Benchmarks:** TPC-H benchmark, an implementation of the K-Means clustering algorithm using the Mahout Library from HiBench (K-Means benchmarks), Hadoop mapreduce application

**Tools:** physical power meter

**Context:** Hadoop (parallel)

**OS:** Linux

**Paper32: Caching to Reduce Mobile App Energy Consumption**

Not relevant (no benchmarks and no tools)

**Paper33: Characterizing Energy Consumption of Third-Party API Libraries using API Utilization Profiles**

**Benchmarks:** micro- benchmark proposed by Rocha et al. [9]

**Tools:** RAPL (only mentioned), Monsoon power monitor

**Context:** Third-Party API Libraries using API Utilization Profiles

**OS:** Android

**Paper34: Analysis of Performance and Energy Consumption of Wearable Devices and Mobile Gateways in IoT Applications**

**Benchmarks:** LOCUS benchmark

**Tools:** not found

**Context:** serial and multi-threading

**OS:** Android

**paper35: Energy Efficiency Modeling of Parallel Applications**

**Benchmarks:** LAMMPS: <https://www.lammps.org/bench.html> , OpenMP

**Tools:** pm\_counters, CrayPAT

**Context:** Parallel applications

**OS:** Linux

**paper36: same as paper35**

**paper37: Evaluating Energy-Efficiency using Thermal Imaging**

Not relevant

**paper38: Towards the Prediction of the Performance and Energy Efficiency of Distributed Data Management Systems**

**Benchmarks:** Yahoo Cloud Serving Benchmark, TPC-H, StarSchema

**Tools:** device (not profiler)

**Context:** Cloud computing

**OS:** Cloud hardware

**paper39: Debugging Energy-efficiency Related Field Failures in Mobile Apps**

**Benchmark:** web page of benchmark not available

**Tools:** GSam Battery Monitor, GreenDroid

**Context:** Mobile consumption

**OS:** Android

**paper40: The Energy Efficiency of Modern Multicore Systems**

**Benchmarks:** NAS Parallel Benchmark, Rodinia, PARSEC

**Tools:** power meter

**Context:** parallel

**OS:** Linux

**paper41: Adaptive Virtual Machine Migration Mechanism for Energy Efficiency**

Not relevant (no tools and benchmarks)

**paper42: Cross-Layer Memory Management to Improve DRAM Energy Efficiency**

**Benchmarks:** MemBench, SciMark, DaCapo

**Tools:** self designed profiling tool, Intel’s Performance Counter Monitor

**Context:** Memory

**OS:** Linux

**paper43: Reactive-based Complex Event Processing: An Overview and Energy Consumption Analysis of CEP.js**

**Benchmarks:** not found

**Tools:** https://developer.android.com/studio/profile/battery-historian

**Context:** analysis of JavaScript library called CEP.js

**OS:** Android

**paper44: High Performance Computing Enabled Simulation of the Food-Water-Energy System**

**Benchmarks:** analysis of mpi4ibis (not benchmark)

**Tools:** Score-P performance monitor, Vampir [20], and Allinea Map

**Context:** HPC for simulation

**OS:** HPC

**paper45: Optimizing Power and Energy Efficiency in Cloud Computing**

**Benchmarks:** not found

**Tools:** not found

**Context:** Cloud computing

**OS:** cloud

**paper46: EPPMiner: An Extended Benchmark Suite for Energy, Power and Performance Characterization of Heterogeneous Architecture**

**Benchmarks:** EPPMiner <https://github.com/hclhkbu/EPPMiner>

**Tools:** CodeXLPowerProfiler (AMD)

**Context:** heterogeneous system

**OS:** Linux and Windows

**paper47: Automated Re-factoring of Android Apps to Enhance Energy-efficiency**

**Benchmarks:** 0xbenchmark (f-droid)

**Tools:** Monsoon Power Monitor

**Context:** Mobile app

**OS:** Android

**paper48: Computation Offloading for Energy Efficiency of Smart Devices**

**Benchmarks:** implemented a Hanoi Tower benchmark application

**Tools:** Monsoon Power Monitor

**Context:** Mobile apps

**OS:** Android

**paper49:** [**A first-order approximation of microarchitecture**](https://dl-acm-org.proxy.bnl.lu/doi/10.1145/3229631.3229633) **energy-efficiency**

**Benchmarks:** SPEC CPU 2006 Benchmark

**Tools:** RAPL

**Context:** parallel computing

**OS:** Linux

**paper50: Compile-Time Silent-Store Elimination for Energy Efficiency: an Analytic Evaluation for Non-Volatile Cache Memory**

**Benchmarks:** Rodinia, SPEC95

**Tools:** Check: Phase-Change RAM (PCRAM), Spin-Transfer Torque RAM (STT- RAM) and Resistive RAM (RRAM)

**Context:** Memory

**OS:** Not found

**paper51: OPTIMIZING ENERGY CONSUMPTION IN GPUS THROUGH FEEDBACK-DRIVEN CTA SCHEDULING**

**Benchmarks:** CUDA SDK (NVIDIA 2011), Parboil (Strat ton et al. 2012), Mars (He et al. 2008), Shoc (Danalis et al. 2010), and LonestarGPU

**Tools:** GPUWattch

**Context:** Gpu optimization

**OS:** GPU (os not found)

**paper52: Special Session Paper: Data Analytics Enables Energy- Efficiency and Robustness: From Mobile to Manycores, Datacenters, and Networks**

**Benchmarks:** SPLASH-2 and PARSEC

**Tools:** not found

**Context:** Mobile

**OS:** Android

**paper53: Write Energy Reduction for PCM via Pumping Efficiency Improvement**

**Benchmarks:** Mibench

**Tools**: not found

**Context:** not understood

**OS:** not mentioned

**paper54: Should energy consumption influence the choice of Android third-party HTTP libraries?**

**Benchmarks:** not found (related to other papers)

**Tools:** Monsoon power monitor

**Context:** Mobile

**OS:** Android

**paper55:The Energy Interface Challenge. Towards Designing Effective Energy Efficiency Interfaces for Electric Vehicles**

Not relevant

**paper56: Peak Efficiency Aware Scheduling for Highly Energy Proportional Servers**

**Benchmarks:** SPECpower

**Tools:** insertion of sensor in device (outside device)

**Context:** energy efficiency in data centers

**OS:** servers

**paper57: On Boosting Energy-Efficiency of Heterogeneous Embedded Systems via Game Theory**

**Benchmarks:** SD-VBS, OpenBLAS, PARSEC, SPEC CPU2006

**Tools:** Hardware Monitoring Driver

**Context:** Heterogeneous (hybrid) systems

**OS:** Linux

**paper58: An Optimized VM Placement Approach to Reduce Energy Consumption in Green Cloud Computing**

**Benchmarks:** not found

**Tools:** CloudSim, GreenCloud, GDCSim

**Context:** Cloud computing

**OS:** Data centers

**paper59: Performance-based Guidelines for Energy Efficient Mobile Applications**

**Benchmarks:** GreenBenchmark: <http://www.github.com/luiscruz/greenbenchmark>

**Tools (mentioned):** PowerTutor [11], vLens [12], eProf [13], or eCalc, Monsoon

**Tools (used):** plugged sensor

**Context:** Mobile apps

**OS:** android

**paper60: Energy Efficiency is Not Enough: Towards a Batteryless Internet of Sounds**

Not relevant

**paper61: DeepFEC: Energy Consumption Prediction under Real-World Driving Conditions for Smart Cities**

**Benchmarks:** ML algorithms

* MultivariateRegression(MR)
* SVR (Support Vector Regression)
* ANNs
* RNN (recurrent neural network)
* GRU (Gated Recurrent Unit)
* LSTM: Long short-term memory
* Bi-LSTM [6]: Using bidirectional LSTM
* DCNN
* ST-ResNet
* LC-RNN

**Tools:** not found

**Context:** Neural Networks

**OS:** not found

**paper62: Products go Green: Worst-Case Energy Consumption in Software Product Lines**

**Benchmarks:** San Diego Vision: <http://parallel.ucsd.edu/vision/>

**Tools:** RAPL

**Context:** energy performance of software product lines

**OS:** Linux Ubuntu 14.04 LTS

**paper63: Improving Energy Efficiency in Memory-constrained Applications Using Core-specific Power Control**

**Benchmarks:** PCHASE Benchmark

**Tools:** RAPL

**Context:** HPC and Memory performance

**OS:** Linux

**paper64:Byte-Addressable Update Scheme to Minimize the Energy Consumption of PCM-Based Storage Systems**

**Benchmarks:** Bonnie++ [Russell Coker 2001], IOzone [Norcott 2006], and Postmark

**Tools:** not found

**Context:** PCM-Based Storage Systems

**OS:** Linux

**paper65: Improving Energy Efficiency of Coarse-Grain Reconfigurable Arrays Through Modulo Schedule Compression/Decompression**

not relevant

**paper66: Performance-Energy Trade-off in Modern CMPs**

**Benchmarks:** SPEC2017

**Tools:** RAPL

**Context:** Chip multiprocessors

**OS:** Linux

**paper67:Exploiting Dynamic Timing Slack for Energy Efficiency in Ultra-Low-Power Embedded Systems**

**Benchmarks:** binSearch, div, inSort, intAVG, intFilt, mult, rle, tHold, tea8 -> Embedded Sensor Benchmarks, EEMBC benchmarks

**Tools:** Not found

**Context:** Embedded Systems

**paper68: SRAM based Opportunistic Energy Efficiency Improvement in Dual-Supply Near-Threshold Processors**

**Benchmarks:** SPEC2006

**Tools:** constant voltage

**Context:** no really clear context

**OS:** not found

**paper69: Multicast Scaling of Capacity and Energy Efficiency in Heterogeneous Wireless Sensor Networks**

Not relevant

**paper70: Predictable GPUs Frequency Scaling for Energy and Performance**

**Benchmarks:** not found (OpenCL?)

**Tools:** NVIDIA Management Library (NVML) (mentioned, not used). So no tools

**Context:** Parallel architectures

**OS:** GPU

**paper71: Load Balancing of Multimedia Workloads for Energy Efficiency on the Tegra K1 Multicore Architecture**

**Benchmarks:** BLAS, coarse

**Tools:** not found

**Context:** Heterogeneous (hybrid) systems

**OS:** Linux

**paper72: Large-Memory Nodes for Energy Efficient High-Performance Computing**

**Benchmarks:** Unified European Application Benchmark Suite, NAS benchmark

**Tools:** IBM Active Energy Manager power modules

**Context:** HPC

**paper73: Energy–Performance Trade-Offs via the EP Queue**

**Benchmarks:** SPEC benchmark (SPECvirt\_sc2013)

**Tools:** not found

**Context:** Queueing theory, memory

**paper74: Achieving High In Situ Training Accuracy and Energy Efficiency with Analog Non-Volatile Synaptic Devices**

not relevant (nothing found)

**paper75: A First Look at Energy Consumption of NB-IoT in the Wild: Tools and Large-Scale Measurement**

**Benchmarks:** not found

**Tools:** power monitor ( not relevant)

**Contex:** networking

**OS:** not found

**paper76: Retiming for High-performance Superconductive Circuits with Register Energy Minimization**

Not relevant (topic is about circuits and not software and hardware)

**paper77: Energy Consumption and Lifetime Improvement of Coarse- Grained Reconfigurable Architectures Targeting Low-Power Error-Tolerant Applications**

Not relevant

**paper78: Integrating I/Os in Cloudsim for Performance and Energy Estimation**

**Benchmarks:** i/o benchmark fio

**Tools:** CloudSim

**Context:** Cloud

**OS:** Linux 3.2.0 kernel

**Paper79: Energy and Performance Prediction of CUDA Applications using Dynamic Regression Models**

**Benchmarks:** no benchmarks mentioned

**Tools:** EACudaLib (developed by authors)

**Context:** Parallel computing

**OS:** Not found

**Paper80: Enhancing the Energy Efficiency of Journaling File System via Exploiting Multi-Write Modes on MLC NVRAM**

**Benchmarks:** IOzone and Postmark

**Tools:** Not found

**Context:** Non-volatile random-access memory

**OS:** Linux

**Paper81: An ECM-Based Energy-Efficiency Optimization Approach for Bandwidth-Limited Streaming Kernels on Recent Intel Xeon Processors**

**Benchmarks:** not found ( don’t mentioned but speak about chip benchmarks) , OpenMP?

**Tools:** RAPL

**Context:** Performance of chips (CPU)

**OS:** not mentioned

**Paper82: SIMULATION OF ENERGY-EFFICIENT DEMAND RESPONSE FOR HIGH PERFORMANCE COMPUTING SYSTEMS**

**Benchmarks:** PMATMUL, a parallel benchmark for dense matrix multiplication, and STREAM (McCalpin, John D 2002), a benchmark for measuring sustainable memory bandwidth

**Tools:** not found

**Context:** HPC and energy

**OS:** HPC

**Paper83: Thread Batching for High-performance Energy-efficient GPU Memory Design**

**Benchmarks:** CUTCP benchmark (Parboil benchmark), Rodinia

**Tools:** memory usage efficiency is mainly determined by bank-level parallelism (BLP) [30] and row locality measured by row buffer hit rate (RBHR)

**Context:** parallelism of GPU

**OS:** Linux

**Paper84: Improving the Reliability and Energy-Efficiency of High- Bandwidth Photonic NoC Architectures with Multilevel Signaling**

**Benchmarks:** PARSEC

**Tools:** DSENT

**Context:** NoC Architectures

**OS:** not found

**Paper85: Prediction-Guided Performance-Energy Trade-off with Continuous Run-Time Adaptation**

**Benchmarks:**

* Games (2048, curseofwar, and xpilot)
* web browser (*uzbl*)
* speech recognition (*pocketsphinx*)
* video decoder (*ldecode*)
* three applications from the MiBench suite (*rijndael*, *sha*, and *stringsearch*)

**Tools:** built-in sensors

**Context:** Mobile

**OS/Hardware:** Samsung Exynos5422 SoC with 4 ARM Cortex-A15 and 4 Cortex-A7 cores

**Paper86: Energy-Efficient Job-Assignment Policy With Asymptotically Guaranteed Performance Deviation**

not relevant

**Paper87: Approximate Communication Strategies for Energy-Efficient and High Performance NoC: Opportunities and Challenges**

**Benchmarks:** COSMIC Benchmarks

**Tools:** DSENT

**Context:** Network on chip

**OS:** not mentioned

**Paper88: Performance-Aware Task Scheduling for Energy Harvesting Nonvolatile Processors Considering Power Switching Overhead**

not relevant

**Paper89: Energy and Performance Trade-off in Nanophotonic Interconnects using Coding Techniques**

not relevant

**Paper90: Energy Savings and Performance Improvement in Subthreshold Using Adaptive Body Bias**

**Benchmarks:** ISCAS85 (not software based)

**Tools:** Synopsys Hspice

**Context:** Circuits

**OS:** not found

**Paper91: Performance and Thermal Tradeoffs for Energy-Efficient Monolithic 3D Network-on-Chip**

**Benchmarks:** LDPC benchmark, SPLASH-2 benchmarks (FFT, RADIX, LU, and WATER) (Woo et al. 1995) and four PARSEC benchmarks (DEDUP, VIPS, FLUIDANIMATE (FLUID), and CAN- NEAL (CAN)) (Bienia 2011)

**Tools:** McPAT

**Context:** Network on chip

**OS:** Not mentioned

**Paper92: Reinforcing the Energy Efficiency of Cyber-Physical Systems via Direct and Split Cache Consolidation on MLC STT-RAM**

**Benchmarks:** SPEC CPU2000

**Tools:** not mentioned

**Context:** Memory performance

**OS:** not mentioned

**Paper93: Performance & Energy Tradeoffs for Dependent Distributed Applications Under System-wide Power Caps**

**Benchmarks:** cluster and galaxy from Gadget 2.0 [51], a hydrodynamic simulation benchmark lulesh [28], a visualization application VisIt [10], a data mining application kmeans [6], a data compression application pigz [1], and three MapReduce [12] applications: teragen, terasort, and teravalidate

**Tools:** RAPL

**Context:** Parallel Processing

**OS:** Linux 3.13.0

**Paper94: High-Performance and Energy-Efficient 3D Manycore GPU Architecture for Accelerating Graph Analytics**

**Benchmarks:** Pannotia benchmark

**Tools:** Not found

**Context:** Network-on-Chip

**OS:** not mentioned

**Paper95: Exploring Heterogeneous-ISA Core Architectures for High-Performance and Energy-Efficient Mobile SoCs**

**Benchmarks:** Android applications and SPEC benchmarks (SPEC CPU2006) (bzip2, gcc, mcf, hmmer, sjeng, libquantum, omnetpp, astar, namd, soplex, povray, and lbm)

**Tools:** McPAT [10] to estimate power consumption

**Context:** mobile systems-on-chips

**OS:** Android

**Paper96: Energy-Performance Co-Management of Mixed-Sensitivity Workloads on Heterogeneous Multi-core Systems**

**Benchmarks:** Rodinia and PARSEC

**Tools:** power sensors

**Context:** System on a chip

**OS:** Not clear (Linux/Mobile), it is Odroid XU3

**Paper97: Performance, Energy, and Scalability Analysis and Improvement of Parallel Cancer Deep Learning CANDLE Benchmarks**

**Benchmarks:** CANDLE (Cancer Distributed Learning Environment) (python base)

**Tools:** Python’s cProfile [27] to profile the performance and use nvidia-smi to measure the GPU power consumption.

**Context:** Parallel processing

**OS:** not mentioned

**Paper98: Sixteen Heuristics for Joint Optimization of Performance, Energy, and Temperature in Allocating Tasks to Multi-Cores**

**Benchmarks:** FFT [Wu and Gajski 1990], Laplace Equation [Ahmad et al. 2000], Gauss Elimination [Wu and Gajski 1990], and a Robot Control application [Tobita and Kasahara 2002

**Tools:** no profilers

**Context:** Parallel processing

**OS:** not mentioned

**Paper99: QUANTIFYING THE IMPACT OF UNCERTAINTY IN HUMAN ACTIONS ON THE ENERGY PERFORMANCE OF EDUCATIONAL BUILDINGS**

Not relevant (Not Computer Science)

**Paper100: Energy and Performance Efficient Computation Offloading for Deep Neural Networks in a Mobile Cloud Computing Environment**

**Benchmarks:** Models: AlexNet[1], OverFeat[21], VGG16[22] and NiN[20], Chair[23] and Pix2Pix as benchmarks

**Tools:** INA226 power monitoring sensor

**Context:** Mobile cloud computing, deep learning performance

**OS:** not mentioned but something mobile cloud

**Paper101: A data-driven approach to optimize building energy performance and thermal comfort using machine learning models**

not relevant (nothing found)

**Pper102: Cooperative Slack Management: Saving Energy of Multicore Processors by Trading Performance Slack Between QoS-Constrained Applications**

**Benchmarks:** SPEC CPU2006

**Tools:** Perf

**Context:** network-on-chip

**OS:** Linux?

**Paper103: Cuttlefish: Library for Achieving Energy Efficiency in Multicore Parallel Programs**

**Benchmarks:** OpenMP benchmarks (UTS, SOR-irt, SOR-rt, SOR-ws, Heat-irt, Heat-rt, Heat-ws, MiniFE, HPCCG, AMG)

**Tools:** RAPL

**Context:** Parallel programs

**OS:** Ubuntu 16.04.7 LTS running on linux kernel 4.4.0-200-generic x86\_64 (64 bit)

**Paper104: SwiftGPU: Fostering Energy Efficiency in a Near-Threshold GPU Through a Tactical Performance Boost**

Not relevant

**Paper105: PROFET: Modeling System Performance and Energy Without Simulating the CPU**

**Benchmarks:** STREAM benchmark (memory benchmark) , SPEC CPU2006, Unified European Application Benchmark Suite (UEABS)

**Tools:** power meter

**Context:** Memory

**OS:** not mentioned

**Paper106: ENERGYSIM: AN ENERGY CONSUMPTION SIMULATOR FOR WEB SEARCH ENGINE PROCESSORS**

**Benchmarks:** MBSPDiscover benchmark

**Tools:** Performance Monitoring Counters (not really a profiler)

**Context:** search engines processors

**OS:** not mentioned

**Paper107: A Performance-Portable Nonhydrostatic Atmospheric Dycore for the Energy Exascale Earth System Model Running at Cloud-Resolving Resolutions.**

**Benchmarks:** LINPACK Benchmark, NGGPS Benchmark

**Tools:** not found

**Context:** Cloud computing

**OS:** cloud

**Paper108: Simulation-Based Performance Evaluation of an Energy-Aware Heuristic for the Scheduling of HPC Applications in Large-Scale Distributed Systems**

**Benchmarks:** SPECpower ssjR 2008 benchmark

**Tools:** Seems benchmark can measure energy performance

**Context:** HPC

**OS:** HPC

**Paper109: Edge-TM: Exploiting Transactional Memory for Error Tolerance and Energy Efficiency**

**Benchmarks:** OpenMP

**Tools:** not found

**Context:** Memory

**OS:** not mentioned

**Paper110: FlowPaP and FlowReR: Improving Energy Efficiency and Performance for STT-MRAM-Based Handheld Devices under Read Disturbance**

Benchmarks: mobile benchmarks from Moby

Tools: not found

Context: Mobile

OS: Android

**Paper111: Graphicionado: A High-Performance and Energy-Efficient Accelerator for Graph Analytics**

**Benchmarks:** Graph500 Benchmark

**Tools:** constant voltage

**Context:** Graphs and parallel computing

**OS:** 32 threads on a 16-core Haswell Xeon processor

**Paper112: CASH: Compiler Assisted Hardware Design for Improving DRAM Energy Efficiency in CNN Inference**

**Benchmarks:** CNN Benchmarks: We evaluated 4 state-of-the-art CNN architec- tures for our study: ResNet-18, ResNet-34 [21], GoogLeNet [42], and DenseNet

**Tools:** Not mentioned

**Context:** machine learning (ML) and deep learning (CNN)

**OS:** not mentioned

**Paper113: Powerstrip: High-Performance Compression for Energy Data**

**Benchmark**: lzbench benchmarking tool

**Tools:** not found (seems hardware device)

**Context:** data compression

**OS:** not mentioned

**Paper114: Don’t Forget Your Electricity Bills! An Empirical Study of Characterizing Energy Consumption of 3D Printers**

Not relevant

**Paper115: CACF: A Novel Circuit Architecture Co-optimization Framework for Improving Performance, Reliability and Energy of ReRAM-based Main Memory System**

**Benchmark:** SPEC CPU2006 benchmark suite

**Tools:** parameters are fixed and energy can be computed

**Context:** Memory system

**OS:** not mentioned

**Paper116: MEPHESTO: Modeling Energy-Performance in Heterogeneous SoCs and Their Trade-Offs**

**Benchmarks:** STREAM benchmark, Rodinia benchmark, Roofline

**Tools:** tegra\_parser tool

**Context:** System on a chip (parallel computing?)

**OS:** not mentioned

**Paper117: PeaPaw: Performance and Energy-Aware Partitioning of Workload on Heterogeneous Platforms**

**Benchmarks:** STREAM benchmark [McCalpin 1995] (i.e., for CPU) and the scalable heterogeneous computing (SHOC) benchmark suite [Danalis et al. 2010]

**Tools:** physical monitoring

**Context:** Parallel computing

**OS:** not mentioned

**Paper118: GreenGear: Leveraging and Managing Server Heterogeneity for Improving Energy Efficiency in Green Data Centers**

**Benchmarks:** SPECjbb benchmark <http://www.spec.org/jbb2013/>

**Tools:** benchmark

**Context:** consumption in data centers

**OS:** server Ubuntu Linux

**Paper119: CG-OoO: Energy-Efficient Coarse-Grain Out-of-Order Execution Near In-Order Energy with Near Out-of-Order Performance**

**Benchmarks:** SPEC Int 2006 benchmark

**Tools:** not found

**Context:** didn’t get

**OS**: Not mentioned

**Paper120: DarkCache: Energy-Performance Optimization of Tiled Multi-Cores by Adaptively Power-Gating LLC Banks**

**Benchmarks:** PARSEC

**Tools:** McPat, dsent and Cacti

**Context:** Network on chip

**OS**: not mentioned

**Paper121: Survey of Approaches for Assessing Software Energy Consumption**

Benchmarks: Not found

Tools: Silicon Labs: <https://www.silabs.com/developers/simplicity-studio> , Green Droid, ELens

Context: Monitoring energy consumption

OS: Not mentioned

**Paper122: Achieving energy efficiency using a Software Product Line Approach**

Benchmarks: No name of exact benchmark

Tools: Watts up? Pro, Intel Platform Power Estimation Tool, Monsoon Power Monitor

Context: Power estimation and optimization of hardware

OS: Not found

**Paper123: Verified Instruction-Level Energy Consumption Measurement for NVIDIA GPUs**

Benchmarks: matrix multiplication CUDA benchmark (developed by authors but similar benchmarks exist) : <https://github.com/MaxKotlan/Cuda-Matrix-Multiplication-Benchmark>

Tools: PAPI, Multi-Threaded Synchronized Monitoring (MTSM)

Context: GPU energy measurement and comparison

OS: Linux

**Paper124: Demystifying Energy Consumption Dynamics in Transiently powered Computers**

Benchmarks: Advanced Encryption Standard (AES), Activity Recognition (AR)

Tools: developed by them

Context: Embedded and cyber-physical systems energy measurement

OS: Not found

**Paper125: Harnessing Voltage Margins for Energy Efficiency in Multicore CPUs**

Benchmarks: SPEC CPU2006

Tools: no profilers, only physical devices

Context: measuring voltage of CPU

OS: Linux

**Paper126: AEAS - Towards High Energy-efficiency Design for OpenSSL Encryption Acceleration through HW/SW Co-design**

Benchmarks: OpenSSL speed

Tools: digital power meter

Context: OpenSSL encryption energy measurement

OS: Ubuntu

**Paper127: Loop Unrolling for Energy Efficiency in Low-Cost Field-Programmable Gate Arrays**

Benchmarks: SIMON-128 (security), AES-256 (security), Bitonic (Sort), DES (security), CORDIC (Math)

Tools: Physical device

Context: Power Consumption of Sequential Benchmarks

OS: no mentioned

**Paper128: Mobilizing the Micro-Ops: Exploiting Context Sensitive Decoding for Security and Energy Efficiency**

Benchmarks: MiBench, SPEC 2006 CPU

Tools: McPat

Context: Security

OS: seems Linux

**Paper129: CROW: A Low-Cost Substrate for Improving DRAM Performance, Energy Efficiency, and Reliability**

Benchmarks: SPEC CPU2006, TPC, STREAM, MediaBench

Tools: Not found

Context: improving DRAM performance

OS: Not mentioned

**Paper130: AEP: An Error-bearing Neural Network Accelerator for Energy Efficiency and Model Protection**

Not relevant

Paper131: same as paper130

**Paper132: GRAPE: Minimizing Energy for GPU Applications with Performance Requirements**

Benchmarks: Rodinia, Parboil

Tools: GPGPU-Sim v3.2.2, GPUWattch

Context: GPU energy minimization

OS: not mentioned