# The 16th IEEE International Conference on High Performance Computing and Communications HPCC 2014

# The 11th IEEE International Conference on Embedded Software and Systems ICESS 2014

# The 6th International Symposium on Cyberspace Safety and Security CSS 2014

August 20-22, 2014
Paris, France

## Conference Program and Information Booklet

*Updated 26/08/14*



### Organized by

FEMTO-ST Institute, Ecole Centrale Paris, Ecole des Mines de Paris France

### Sponsored by

IEEE, IEEE TCSC, IEEE Computer Society, CNRS, FEMTO-ST Institute, Ecole Centrale Paris, Ecole des Mines de Paris, University of Franche-Comté, NVIDIA, Transtec.

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**Tuesday, August 19**

| | Main room | L109 | L106 | L107 | V107 | V106a | V127 | V106b | V128 | Registr. |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:00 | | | | | | | | | | |
| 09:00 | | | | | | | | | | |
| 10:00 | | | | | | | | | | |
| 11:00 | | | | | | | | | | |
| 12:00 | | | | | | | | | | |
| 13:00 | | | | | | | | | | |
| 14:00 | | | | | | | | | | |
| 15:00 | | | | | | | Registration | | | |
| 16:00 | | | | | | | | | | |
| 17:00 | | | | | | | | | | |
| 18:00 | | | | | | | | | | |
| 19:00 | | | | | | | | | | |

**Wednesday, August 20**

| | Main room | L109 | L106 | L107 | V107 | V106a | V127 | V106b | V128 | Registr. |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:00 | Self-service coffee | | | | | | | | | |
| | Opening | | | | | | | | | |
| 09:00 | Keynote 1 | | | | | | | | | |
| 10:00 | Coffee break and Group photo, be there! | | | | | | | | | |
| 11:00 | HPCC DAT1 | ICESS 1 | CSS 1 | ICESS 2 | HPCC CCWS1 | HPCC DAL1 | Registration | HPCC CCWS2 | ICESS 3 | |
| 12:00 | | | | | | | | | | |
| 13:00 | Lunch | | | | | | | | | |
| 14:00 | Keynote 2 | | | | | | | | | |
| 15:00 | HPCC DAT2 | ICESS 4 | CSS 2 | ICESS 5 | HPCC CCWS3 | HPCC DAL2 | HPCC MCN1 | HPCC SEC1 | | |
| 16:00 | | | | | Coffee break | | | | | |
| 17:00 | HPCC CCWS4 | ICESS 6 | CSS 3 | ICESS 7 | HPCC DAL4 | HPCC DAL3 | HPCC MCN2 | HPCC SEC2 | HPCC SEC3 | |
| 18:00 | | | | | | | | | | |
| 19:00 | Welcome reception (Ecole des Mines) | | | | | | | | | |

## Thursday, August 21

| | Main room | L109 | L106 | L107 | V107 | V106a | V127 | V106b | V128 | Registr. |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:00 | | | | | Self-service coffee | | | | | |
| 09:00 | Keynote 3 | | | | | | | | | |
| 10:00 | | | | | Coffee break | | | | | |
| 11:00 | HPCC DAr1 | ICESS 8 | CSS 4 | HPCC SEC4 | HPCC SCUC1 | HPCC DAl5 | CSS 5 | HPCC MCN3 | ICESS 9 | |
| 12:00 | | | | | Lunch | | | | | |
| 13:00 | | | | | | | | | | |
| 14:00 | Keynote 4 | | | | | | | | | |
| 15:00 | | | | | Coffee break | | | | | |
| 16:00 | HPCC DAr2 | ICESS 10 | HPCC CCWS5 | ICESS 11 | HPCC SCUC2 | HPCC DAl6 | HPCC DAT3 | HPCC MCN4 | | |
| 17:00 | | | | | | | | | | |
| 18:00 | | | | | | | | | | |
| 19:30 | | | | Banquet dinner (dinner cruise on the Seine) | | | | | | |

## Friday, August 22

| | Main room | L109 | L106 | L107 | V107 | V106a | V127 | V106b | V128 | Registr. |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:00 | | | | | Self-service coffee | | | | | |
| 09:00 | AHPCN 1 | ARCHI 1 | WCT 1 | GPU | PPCSS 1 | AMDA 1 | EMCA | M2A2 1 | WNET 1 | |
| 10:00 | | | | | Coffee break | | | | | |
| 11:00 | AHPCN 2 | ARCHI 2 | WCT 2 | WIP 1 | PPCSS 2 | AMDA2 O&S | ETD 1 | M2A2 2 | WNET 2 | |
| 12:00 | | | | | Lunch | | | | | |
| 13:00 | | | | | | | | | | |
| 14:00 | APP | ALG& MOD | WCT 3 | WIP 2 | | | ETD 2 | | | |
| 15:00 | | | | | | | | | | |
| 16:00 | | | | | | | | | | |
| 17:00 | | | | | | | | | | |
| 18:00 | | | | | | | | | | |

## CONCURRENT COMPUTING IN THE MANY-CORE ERA

### PASCAL FELBER

*Professor and Ph.D.*
*University of Neuchâtel, Switzerland.*

Pascal Felber received his M.Sc. and Ph.D. degrees in Computer Science from the Swiss Federal Institute of Technology. Between 1998 and 2004 he has worked at Oracle Corporation and Bell-Labs (Lucent Technologies) in the USA, and at Institut EURECOM in France. Since 2004, he is a Professor of Computer Science at the University of Neuchâtel, Switzerland, working in the field of concurrent, dependable, and distributed systems. He is also leading the research center for Complex Systems and Big Data. He has published over 100 research papers in various journals and conferences.

After decades of improvement in the computational power of processors, frequency scaling came to an end with the near-simultaneous approach of several limits in device technology. The industry has responded with ubiquitous multicore processors, but scalable concurrency remains a challenge for many applications. Further, it now appears likely that future architectures will be not only massively parallel, but also massively heterogeneous with various combinations of processing units (CPUs, GPUs, and other accelerators). In this talk, we will discuss about the current state of concurrent programming for modern architectures, notably support for transactional memory and other synchronization extensions. We will also cover programming paradigms that explicitly target cloud computing.

*Wednesday 14:00, Main room*                                        *session chair: Pr. Frédéric Magoules*
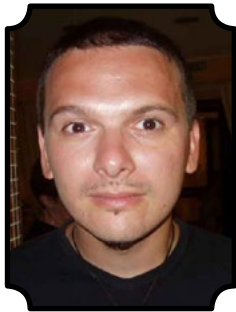
### PARALLEL PATTERNS, DATA-CENTRIC CONCURRENCY, AND HETEROGENEOUS COMPUTING

### MARCO ALDINUCCI

*Assistant Professor and Ph.D.*
*University of Torino, Italy*

Marco Aldinucci has a Ph.D. in Computer Science from University of Pisa. He has served as a researcher at University of Pisa and at Italian National Research Agency. He is currently leading the parallel computing research group in the Computer Science Department of University of Torino, and the NVidia CUDA research center at University of Torino. He is the recipient of the 2011 HPC Advisory Council award. He has authored over 120 papers and participated in over 20 research projects concerning parallel computing, autonomic computing, grid and cloud topics, including the EC-FP6/FP7 CoreGRID, GridComp, BEinGRID, Paraphrase, HiPEAC and REPARA. His main research is focused on models and tools for high-level parallel programming, parallel and distributed computing, and autonomic computing. He participated to the design of several frameworks for parallel programming including compilers, libraries and frameworks, both in industrial and academic teams.

The shift toward multicore and many-core technologies has many drivers that are likely to sustain this trend for several years to come. Software technology is consequently changing: in the long term, writing parallel programs that are efficient, portable, and correct must be no more onerous than writing sequential programs. For many years parallel programming has not embraced much more than low-level synchronisation and communication libraries (and this scenario still persists for heterogeneous platforms). Algorithmic skeletons and parallel patterns have been proposed (in different communities) as a way to lift parallel programming in the hierarchy of abstractions. With, among the others, Google MapReduce and Intel TBB/CnC, they are becoming mainstream approaches for a number of platforms and applicative areas. We believe that pattern-based applications can be more or equally efficient as their low-level counterparts, provided they are supported by an efficient run-time support, able to efficiently address the weakness of parallel platforms: data movements.

*Thursday 09:00, Main room*        *session chair: Pr. Julien Bourgeois*

## Computing with living networks: slime mould computers and electronics

### Andrew Adamatzky

*Professor and Ph.D,*
*University of West of England, UK*

Andrew Adamatzky is Professor in the Department of Computer Science and Director of the Unconventional Computing Centre, University of the West of England, Bristol, UK. He does research in reaction-diffusion computing, cellular automata, physarum computing, massive parallel computation, applied mathematics, collective intelligence and robotics, bionics, computational psychology, non-linear science, novel hardware, and future and emergent computation.

Plasmodium of acellular slime mould Physarum polycephalum is a gigantic single cell visible by unaided eye. The cell shows a rich spectrum of behavioural morphological and physiological patterns in response to changing environmental conditions. Given data represented by chemical or physical stimuli we show how to tune the behaviour of the slime mould to make it solve a range of computing and sensing tasks. We overview results of laboratory experimental studies on prototyping of the slime mould computing devices: morphological processors for approximation of Voronoi diagram, planar shapes, maze solvers, and logical gates implemented via collision of active growing zones and tactile responses of P. polycephalum. We also overview a range of electronic components --- memristor, chemical, tactile and colour sensors --- made of the slime mould. We finalize the talk with a vision of future nervous systems made of the slime mould.

## NEXT-GENERATION EMBEDDED SYSTEMS: FUNCTIONAL REACTIVE PROGRAMMING AND REAL-TIME VIRTUAL RESOURCES

### ALBERT M. K. CHENG

*Professor and Ph.D,*
*University of Houston, Texas, USA*

Albert M. K. Cheng is Professor and former interim Associate Chair of the Computer Science Department at the University of Houston (UH). He is the founding Director of the UH Real-Time Systems Laboratory. He received the B.A. with Highest Honors in Computer Science, graduating Phi Beta Kappa at age 19, the M.S. in Computer Science with a minor in Electrical Engineering at age 21, and the Ph.D. in Computer Science at age 25, all from The University of Texas at Austin, where he held a GTE Foundation Doctoral Fellowship. He has served as a technical consultant for a number of organizations, including IBM and Shell, and was also a Visiting Professor at Rice University and the City University of Hong Kong. He is a co-founder of ZapThru.com, where he is currently the Chief Strategy and Technology Director. A recipient of numerous awards, Prof. Cheng is the author/co-author of 200 top-tier refereed publications, and has presented 100 seminars, tutorials, panel positions, and keynotes. He is and has been on the technical program committees (including many program chair positions) of over 230 conferences and editorial boards. Prof. Cheng is the author of the popular textbook entitled Real-Time Systems: Scheduling, Analysis, and Verification (Wiley).

Sophisticated digital systems are increasingly used to control complex physical components ranging from traditional stand-alone systems to highly-networked cyber-physical systems. Functional reactive programming (FRP) has several benefits over imperative programming for implementing embedded and real-time software, and can potentially transform the way we implement next-generation embedded systems. The first part of this keynote will introduce a framework for accurate response time analysis, scheduling, and verification of embedded controllers implemented as FRP programs. Real-time resource partitioning divides hardware resources into temporal partitions and allocates these partitions as virtual resources to application tasks. Open embedded systems make it easy to add and remove software applications as well as to increase resource utilization and reduce implementation cost when compared to systems which physically assign distinct computing resources to run different applications. The second part of this keynote will describe ways to maintain the schedulability of real-time tasks as if they were scheduled on dedicated physical resources and increase the utilization of the physical resources.

## IEEE INTERNATIONAL CONFERENCE ON HIGH PERFORMANCE COMPUTING AND COMMUNICATIONS (HPCC 2014)

### HPCC DAr1: DISTRIBUTED ARCHITECTURE
*Thursday 10:30, Main room*                    *session chair: Hakim Mabed*

**Enabling PGAS Productivity with Hardware Support for Shared Address Mapping; a UPC Case Study**
  Olivier Serres, Abdullah Kayi, Ahmad Anbar and *Tarek El-Ghazawi*.

**HoL-blocking Avoidance Routing Algorithms in Direct Topologies**
  *Roberto Peñaranda*, Crispin Gomez Requena, Maria Gomez, Pedro Lopez and Jose Duato.

**Analyzing the Optimal Voltage/Frequency Pair in Fault-Tolerant Caches**
  *Vicent Lorente*, Alejandro Valero, Salvador Petit and Julio Sahuquillo.

### HPCC DAr2: DISTRIBUTED ARCHITECTURE
*Thursday 15:00, Main room*                    *session chair: Christakis Nicholas*

**Dynamic WCET Estimation for Real-Time Multicore Embedded Systems Supporting DVFS**
  *José Luis March*, Salvador Petit, Julio Sahuquillo, Houcine Hassan and José Duato.

**A Flexible and Scalable Affinity Lock for the Kernel (SP)**
  *Benlong Zhang*.

**Remapping NUCA: Improving NUCA Cache's Power Efficiency (SP)**
  Hui Wang, Chunrong Lai, Yicong Huang, Shih-Lien Lu, *Rui Wang*, Zhongzhi Luan and Depei Qian.

**An Energy-Efficient Multi-GPU Supercomputer (SP)**
  *David Rohr*, Sebastian Kalcher, Matthias Bach, Abdulqadir A. Alaqeeli, Hani M. Alzaid, Dominic Eschweiler, Volker Lindenstruth, Sakhar Alkhereyf, Ahmad Alharthi, Abdulelah Almubarak, Ibraheem Alqwaiz and Riman Bin Suliman.

### HPCC DAl1: DISTRIBUTED ALGORITHMS
*Wednesday 10:30, V106a*                    *session chair: Alain Refloch*

**SCADOPT: An Open-source HPC Framework for Solving PDE Constrained Optimization Problems Using AD**
  *Kim Feldhoff*, Martin Flehmig, Ulf Markwardt, Wolfgang E. Nagel, Maria Schütte and Andrea Walther.

**Accelerated solution of Helmholtz equation with Iterative Krylov Methods on GPU**
  *Abal-Kassim Cheik Ahamed* and Frédéric Magoules.

**Spectral Domain Decomposition Method for Natural Lighting and Medieval Glass Rendering**
  *Guillaume Gbikpi-Benissan*, Rémi Cerise, Patrick Callet and Frederic Magoules.

A synchronous parallel max-flow algorithm for real-world networks
  *Guojing Cong*.

## HPCC DAl2: Distributed Algorithms

*Wednesday 15:00, V106a*                                  *session chair: Peter Kropf*

**Benefit of Unbalanced Traffic Distribution for Improving Local Optimization Efficiency in Network-on-Chip**
> *Weiwei Fu, Yuan Mingmin, Tianzhou Chen, Qingsong Shi, Li Liu and Minghui Wu.*

**Research on Mahalanobis Distance Algorithm optimization based on OpenCL**
> *Qingchun Xie, Yunquan Zhang and Haipeng Jia.*

**HSR: Hierarchical Source Routing Model for Network-on-Chip**
> *Yuan Mingmin, Fu Weiwei, Chen Tianzhou and Wu Minghui.*

## HPCC DAl3: Distributed Algorithms

*Wednesday 17:00, V106a*                                  *session chair: Khaddaj Souheil*

**An Exploration on Quantity and Layout of Wireless Nodes for Hybrid Wireless Network-on-chip**
> *Chen Tianzhou, Yuan Mingmin, Fu Weiwei and Wu Minghui.*

**Acceleration of Stereo-Matching on Multi-core CPU and GPU**
> *Tian Xu, Paul Cockshott and Susanne Oehler.*

**A technique for the long term preservation of finite element meshes**
> *Peter Ivanyi.*

## HPCC DAl4: Distributed Algorithms

*Wednesday 17:00, V107*                                  *session chair: Hakim Mabed*

**Parallel Sub-Structuring Methods for solving Sparse Linear Systems on a cluster of GPU**
> *Abal-Kassim Cheik Ahamed and Frédéric Magoules.*

**Fast and Green computing with Graphics Processing Units for the solving of sparse linear systems**
> *Abal-Kassim Cheik Ahamed, Alban Desmaison and Frédéric Magoules.*

**Coupling and Simulation of Fluid-Structure Interaction Problems for Automotive Sun-roof on Graphics Processing Unit**
> *Liang Simon Lai, Choi-Hong Lai, Abal-Kassim Cheik Ahamed and Frédéric Magoules.*

## HPCC DAl5: Distributed Algorithms

*Thursday 10:30, V106a*                                  *session chair: Khaddaj Souheil*

**Comparison of Xeon Phi and Kepler GPU performance for finite element numerical integration (SP)**
> *Krzysztof Banaś and Filip Krużel.*

**Efficient Work-Stealing with Blocking Deques (SP)**
> *Chi Liu, Yi Liu and Ping Song.*

**Optimizing Cache Locality for Irregular Data Accesses on Many-Core Accelerator Chips (SP)**
> *Nhat-Phuong Tran and Myungho Lee.*

## HPCC DAl6: Distributed Algorithms

*Thursday 15:00, V106a*       *Session chair: Khaddaj Souheil*

**LU Factorization of Small Matrices: Accelerating Batched DGETRF on the GPU (SP)**
*Tingxing Dong, Azzam Haidar, Piotr Luszczek, James Austin Harris, Stan Tomov and Jack Dongarra.*

**GPU acceleration of Newton's method for large systems of polynomial equations in double double and quad double arithmetic (SP)**
*Jan Verschelde and Xiangcheng Yu*

**An Adaptive Task Granularity based Scheduling for Task-centric Parallelism**
*Jianmin Bi, Xiaofei Liao, Yu Zhang, Chencheng Ye, Hai Jin, Laurence T. Yang*

## HPCC CCWS1: Cloud Computing and Web Services

*Wednesday 10:30, V107*       *session chair: Claude Tadonki*

**An Energy-Efficient VM Placement in Cloud Datacenter**
*Fei Teng, Danting Deng, Lei Yu and Frederic Magoules.*

**Reducing Memory in Software-Based Thread-Level Speculation for JavaScript Virtual Machine Execution of Web Applications (SP)**
*Jan Kasper Martinsen, Håkan Grahn, Anders Isberg and Henrik Sundström.*

**Algorithms for Balanced Graph Bi-partitioning (SP)**
*Jigang Wu, Guiyuan Jiang, Lili Zheng and Suiping Zhou.*

**Optimizing the Topologies of Virtual Networks for Cloud-based Big Data Processing**
*Cong Xu, Jiahai Yang, Hui Yu, Haizhuo Lin and Hui Zhang.*

## HPCC CCWS2: Cloud Computing and Web Services

*Wednesday 10:30, V106b*       *session chair: Philipp Brune*

**Accelerating Massive VMs Booting Up**
*Dayang Zheng, Hai Jin and Xiaofei Liao.*

**Performance Driven Cloud Provisioning**
*Jay Kiruthika and Souheil Khaddaj.*

**The HPS3 service: reduction of cost and transfer time for storing data on clouds**
*Jorge Veiga, Guillermo Taboada, Xoán Carlos Pardo and Juan Tourino.*

**Securing Cloud Users at Runtime via a Market Mechanism: A case for Federated Identity**
*Giannis Tziakouris, Carlos Joseph Mera Gómez and Rami Bahsoon.*

## HPCC CCWS3: Cloud Computing and Web Services

*Wednesday 15:00, V107*       *session chair: Philipp Brune*

**Cost-effective Virtual Machine Image Replication Management for Cloud Data Centers**
*Dian Shen, Fang Dong, Junxue Zhang and Junzhou Luo.*

**ZDLC-Based Modelling and Simulation of Enterprise Systems**
*Bippin Makoond, Steve Ross-Talbot, Souheil Khaddaj and Stefan Franczuk.*

**Virtual Machine Scheduling Considering Both Computing and Cooling Energy (SP)**
*Xiang Li, Xiaohong Jiang and Yanzhang He.*

## HPCC CCWS4: Cloud Computing and Web Services

*Wednesday 17:00, Main room*                                    *session chair: Yu Lei*

**Cloud Energy Broker: Towards SLA-driven Green Energy Planning for IaaS Providers**
  *Md Sabbir Hasan, Yousri Kouki, Thomas Ledoux and Jean-Louis Pazat*

**Enabling Prioritized Cloud I/O Service in Hadoop Distributed File System (SP)**
  *Tsozen Yeh and Yifeng Sun.*

**Implementation of the KVM hypervisor on several cloud platforms: tuning the Apache CloudStack agent (SP)**
  *Fernando Gomez-Folgar, Antonio Jesus Garcia-Loureiro, Tomas Fernandez Pena, Jose Isaac Zablah and Natalia Seoane.*

## HPCC CCWS5: Cloud Computing and Web Services

*Thursday 15:00, L106*                                    *session chair: Soraya Zertal*

**Harnessing Memory Page Distribution for Network-Efficient Amortized Live Migration (SP)**
  *Kashifuddin Qazi, Yang Li and Andrew Sohn*

**Service deployment in cloud  (SP)**
  *Amel Haji, Asma Ben Letaifa and Sami Tabbane.*

**MOBBS: Multi-tier Block Storage System for Virtual Machines using Object-based Storage (SP)**
  *Sixiang Ma, Haopeng Chen, Heng Lu, Bin Wei and Pujiang He.*

## HPCC SEC1: Scientific and Engineering Computing

*Wednesday 15:00, V106b*                                    *session chair: Nicholas Christakis*

**Improving the Scalability of a Hurricane Forecast System in Mixed-Parallel Environments**
  *Thiago Quirino and Javier Delgado.*

**CESMTuner: An Auto-Tuning Framework for the Community Earth System Model**
  *Ding Nan, Wei Xue, Ji Xu, Haoyu Xu and Song Zhenya.*

**The virtual open page buffer for multi-core and multi-thread processors**
  *Hongwei Zhou, Rangyu Deng and Zefu Dai.*

## HPCC SEC2: Scientific and Engineering Computing

*Wednesday 17:00, V106b*                                    *session chair: Nicholas Christakis*

**On of the Performance of the WRF Numerical Model over Complex Terrain on a High Performance Computing Cluster**
  *Nicholas Christakis, Theodoros Katsaounis, George Kossioris and Michael Plexousakis.*

**Power Consumption Analysis of Parallelized Algorithms on GPUs**
  *Abal-Kassim Cheik Ahamed, Frédéric Magoulès, Alban Desmaison, Jean-Christophe Léchenet, François Mayer, Haifa Ben Salem and Thomas Zhu.*

**TargetDP: an Abstraction of Lattice Based Parallelism with Portable Performance (SP)**
  *Alan Gray and Kevin Stratford.*

## HPCC SEC3: Scientific and Engineering Computing

*Wednesday 17:00, V128*                          *session chair: Michal Merta*

**Communication optimal Least Squares Solver (SP)**
  *Pawan Kumar*.

**FLLOP: A Massively Parallel Solver Combining FETI Domain Decomposition Method and Quadratic Programming (SP)**
  *Vaclav Hapla, Martin Cermak, Alexandros Markopoulos and David Horak.*

**Performance Implication of Multicore Cache Locking on General-Purpose Processors (SP)**
  *Matthew Loach and Wei Zhang.*

## HPCC SEC4: Scientific and Engineering Computing

*Thursday 10:30, L107*                          *session chair: Nicholas Christakis*

**SRFTL: An Adaptive Superblock-based Real-time Flash Translation Layer for NAND Flash Memory**
  *Xin Li*

**Exploiting Hybrid SPM-Cache Architectures to Reduce Energy Consumption for Embedded Computing**
  *Wei Zhang and Lan Wu*

**Texture Directed Mobile GPU Power Management for Closed-Source Games.**
  *Beilei Sun, Li Xi, Jiachen Song, Zhinan Cheng, Yuan Xu, Xuehai Zhou and Mingming Sun.*

## HPCC DAT1: Distributed Applications and Technologies

*Wednesday 10:30, Main room*                          *session chair: Francoise Sailhan*

**Predicting performance of hybrid Master/Worker applications using model-based regression trees**
  *Abel Castellanos, Andreu Moreno, Joan Sorribes and Tomas Margalef.*

**Leveraging Hierarchical Data Locality in Parallel Programming Models (SP)**
  *Ahmad Anbar, Engin Kayraklioglu, Olivier Serres and Tarek El-Ghazawi.*

**Trajectory Pattern Mining over a Cloud-based Framework for Urban Computing**
  *Albino Altomare, Eugenio Cesario, Carmela Comito, Fabrizio Marozzo and Domenico Talia.*

**GPU maps for the space of computation in triangular domain problems**
  *Cristobal Navarro and Nancy Hitschfeld.*

## HPCC DAT2: Distributed Applications and Technologies

*Wednesday 15:00, Main room*                          *session chair: Francoise Sailhan*

**Look Before You Leap: Using the Right Hardware Resources to Accelerate Applications**
  *Jie Shen, Ana Lucia Varbanescu and Henk Sips.*

**An Integrated Hardware-Software Approach to Task Graph Management**
  *Nina Engelhardt, Tamer Dallou, Ahmed Elhossini and Ben Juurlink.*

**A Metadata Update Strategy for Large Directories in Wide-area File Systems (SP)**
  *Guo-Liang Liu and Jing Huang.*

## HPCC DAT3: Distributed Applications and Technologies

*Thursday 15:00, V127*                                              *session chair: Savas Konur*

**Modelling and Stochastic Simulation of Synthetic Biological Boolean Gates (SP)**
*__Daven Sanassy__, Harold Fellermann, Natalio Krasnogor, Savas Konur, Marian Gheorghe, Christophe Ladroue, Sara Kalvala and Laurentiu Mierla.*

**High Performance Simulations of Kernel P Systems (SP)**
*Florentin Eugen Ipate, Marian Gheorghe, Savas Konur, Ionut Mihai Niculescu and __Mehmet E Bakir__.*

**Optimizing GPU Virtualization with Address Mapping and Delayed Submission (SP)**
*__Xiaolin Wang__, Yan Sang, Zhenlin Wang and Yingwei Luo.*

**Buffer on Last Level Cache for CPU and GPGPU data sharing (SP)**
*__Licheng Yu__, Tianzhou Chen and Minghui Wu*

## HPCC MCN1: Mobile Computing and Networking

*Wednesday 15:00, V127*                                             *session chair: Vesna Brujic-Okretic*

**Conflict-free Opportunistic Centralized Time Slot Assignment in Cognitive Radio Sensor Networks**
*__Ons Mabrouk__, Pascale Minet, Hanen Idoudi and Leila Saidane.*

**Network Aware and Power-based Resource Allocation in Mobile Ad hoc Computational Grid**
*__Sayed Chhattan Shah__*

**An Inter-Frame Correlation Based Error Concealment Of Immittance Spectral Coefficients For Mobile Speech And Audio Codecs**
*__Yuhong Yang__, Shaolong Dong, Ruimin Hu, Yanye Wang, Li Gao and Maosheng Zhang.*

## HPCC MCN2: Mobile Computing and Networking

*Wednesday 17:00, V127*                                             *session chair: Vesna Brujic-Okretic*

**Performance Analysis for New Call Bounding Scheme with SFR in LTE-Advanced Networks**
*__Mahammad Safwat__, Hesham El-Badawy, Ahmad Yahya and Hosni El-Motaafy.*

**Adaptive Detection for STBCs in IEEE 802.11ac (SP)**
*__Debasish Ghose__, Smriti Kana Roy, Hung-Ta Pai and Chun-Yi Wei.*

## HPCC MCN3: Mobile Computing and Networking

*Thursday 10:30, V106b*                                             *session chair: Baptiste Zhang*

**On Delivery Delay-Constrained Throughput and End-to-end Delay in MANETs**
*__Yujian Fang__, Yuezhi Zhou, Xiaohong Jiang and Yaoxue Zhang.*

**Source misrouting in King topologies**
*__Esteban Stafford__, Carmen Martinez, Jose Luis Bosque, Fernando Vallejo, Cristóbal Camarero, Borja Perez and Ramon Beivide*

**Avoiding Tree Saturation in the Face of Many Hotspots with Few Buffers**
*__Bradley Kuszmaul__ and William Kuszmaul.*

## HPCC MCN4: Mobile Computing and Networking

*Thursday 15:00, V106b*                    *session chair: Vesna Brujic-Okretic*

**Simultaneous Optical Path-Setup for Reconfigurable Photonic Networks in Tiled CMPs (SP)**
  *Paolo Grani and Sandro Bartolini.*

**Packet storage at multi-gigabit rates using off-the-shelf systems (SP)**
  *Victor Moreno, Pedro M. Santiago Del Río, Javier Ramos, José Luis García-Dorado, Ivan Gonzalez, Francisco J. Gomez-Arribas and Javier Aracil.*

**SyncSnap: Synchronized Live Memory Snapshots of Virtual Machine Networks**
  *Bin Shi, Bo Li, Lei Cui, Jieyu Zhao and Jianxin Li.*

**A Multi-layer Hierarchical Inter-Cloud Connectivity Model for Sequential Packet Inspection of Tenant Sessions Accessing BI as a Service**
  *Hussain Al-Aqrabi, Lu Liu, Richard Hill and Nick Antonopoulos.*

## HPCC SCUC1: Security, Collaborative and Ubiquitous Computing

*Thursday 10:30, V107*                    *session chair: Claude Tadonki*

**Developing Scalable Agents in Blueprint**
  *Alex Muscar.*

**Host-based Card Emulation: development, security, and ecosystem impact analysis (SP)**
  *Mouhannad Alattar and Mohammed Achemlal.*

**A Pairing-free Certificateless Authenticated Group key Agreement Protocol (SP)**
  *Xiaozhuo Gu, Taizhong Xu, Weihua Zhou and Yongming Wang.*

## HPCC SCUC2: Security, Collaborative and Ubiquitous Computing

*Thursday 15:00, V107*                    *session chair: Abal-Kassim Cheik Ahamed*

**CGK: A Collaborative Group Key Management Scheme (SP)**
  *Fatma Hendaoui, Hamdi Eltaief, Habib Youssef and Abdelbasset Trad.*

**A Provisioning Service for Automatic Command Line Applications Deployment in Computing Clouds (SP)**
  *Evgeny Pyshkin and Andrey Kuznetsov*

**CGSIL: Collaborative Geo-clustering Search-based Indoor Localization (SP)**
  *Thong M. Doan, Han N. Dinh, Nam Nguyen and An T. Pham*

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MINES
ParisTech

## IEEE INTERNATIONAL CONFERENCE ON EMBEDDED SOFTWARE AND SYSTEMS (ICESS 2014)

### ICESS1: Energy Measurement and Management

*Wednesday 10:30, L109*                                        *session chair: Man Lin*

**Characterizing Energy Consumption of Real-Time and Media Benchmarks on Hybrid SPM-Caches**
*Lan Wu, Yiqiang Ding and Wei Zhang*

**Learning Based Power Management for Periodic Real-Time Tasks**
*Fakhruddin Muhammad Mahbub Ul Islam and Man Lin*

**Energy Consumption Estimation of Software Components based on Program Flowcharts (SP)**
*Patrick Heinrich, Hannes Bergler and Dirk Eilers*

**An Operation Scenario Model for Energy Harvesting Embedded Systems and an Algorithm to Maximize the Operation Quality (sp)**
*Kazumi Aono, Atsushi Iwata, Hideki Takase, Kazuyoshi Takagi and Naofumi Takagi*

### ICESS2: Platforms and Systems

*Wednesday 10:30, L107*                                        *session chair: Jinhua Guo*

**Modeling Basic Aspects of Cyber-Physical Systems, Part II (Extended Abstract)**
*Yingfu Zeng and Walid Taha.*

**An FPGA Based Resources Efficient Solution for the OmniVision Digital VGA Cameras Family (SP)**
*Elmar Yusifli, Réda Yahiaoui, Saeed Mian Qaisar and Tijani Gharbi*

**Design and Implementation of Low-power Location Tracking System Based on IEEE 802.11 (SP)**
*Sanghyun Son, Yongsu Jeon and Yunju Baek*

### ICESS3: Architecture and Systems

*Wednesday 10:30, V128*                                        *session chair: Yongxin Zhu*

**"CERE": a CachE Recommendation Engine: Efficient Evolutionary Cache Hierarchy Design Space Exploration**
*Gabriel Yessin, Abdel-Hameed Badawy, Vikram Narayana, David Mayhew and Tarek El-Ghazawi*

**Online Data Allocation for Hybrid Memories on Embedded Tele-Health Systems**
*Longbin Chen, Meikang Qiu and Yongxin Zhu.*

**On Formulating Optimized Storage and Memory Space Specifications for Network Embedded Systems (SP)**
*Kleomenis Tsiligkos and Apostolos Meliones.*

## ICESS4: Real-time Scheduling

*Wednesday 15:00, L109*  *session chair: Albert M. K. Cheng*

**Scheduling Analysis of TDMA-Constrained Tasks: Illustration with Software Radio Protocols**
*Shuai Li, Frank Singhoff, Stéphane Rubini and Michel Bourdellès*

**Efficient Online Benefit-Aware Multiprocessor Scheduling Using an Online Choice of Approximation Algorithms**
*Behnaz Sanati and Albert M. K. Cheng*

**Dynamic Reservation-Based Mixed-Criticality Task Set Scheduling**
*Zheng Li and Shangping Ren*

**Minimal Schedulability Testing Interval for Real-Time Periodic Tasks with Arbitrary Release Offsets (SP)**
*Yu Jiang, Qiang Zhou, Xingliang Zou and Albert M. K. Cheng*

## ICESS5: Network Protocols

*Wednesday 15:00, L107*  *session chair: Jinhua Guo*

**Vulnerability Analysis of Clock Synchronization Protocol Using Stochastic Petri Net**
*Jiajun Shen and Dongqin Feng*

**Contiki80211: An IEEE 802.11 Radio Link Layer for the Contiki OS (SP)**
*Ioannis Glaropoulos, Vladimir Vukadinovic and Stefan Mangold*

## ICESS6: Hardware/Software Co-Design

*Wednesday 17:00, L109*  *session chair: Man Lin*

**Planning and Optimization of Resources Deployment: Application to Crisis Management**
*Jason Mahdjoub and Francis Rousseaux.*

**Monitoring Lick Responses in Animal Behavioral Experiments using a PSoC**
*Qingshan Shan, David Bullock, Christian Sumner and Trevor*

**Embedded Face Detection Application based on Local Binary Patterns (SP)**
*Laurentiu Acasandrei and Angel Barriga.*

## ICESS7: Energy-efficient Scheduling and Ressource Allocation

*Wednesday 17:00, L107*  *session chair: Jun Wu*

**Voltage Island Aware Energy Efficient Scheduling of Real-Time Tasks on Multi-core Processors**
*Jun Liu and Jinhua Guo*

**Energy Efficient Dynamic Core Allocation for Video Decoding in Embedded Multicore Architectures**
*Rajesh Kumar Pal, Kolin Paul and Sanjiva Prasad*

**BATS: An Energy-Efficient Approach to Real-Time Scheduling and Synchronization**
*Jun Wu*

## ICESS8: System on Chip (Soc) and Multicore Systems

*Thursday 10:30, L109*                                    *session chair: Binoy Ravindran*

**CABSR:Congestion Agent Based Source Routing for Network-on-Chip**
*Yuan Mingmin, Fu Weiwei, Chen Tianzhou and Wu Minghui*

**On Cache-Aware Task Partitioning for Multicore Embedded Real-Time Systems**
*Aaron Lindsay and Binoy Ravindran*

**Task Migration for Energy Saving in Real-Time Multiprocessor Systems**
*Gang Zeng, Yutaka Matsubara, Hiroyuki Tomiyama and Hiroaki Takada*

## ICESS9: Embedded OS

*Thursday 10:30, V128*                                    *session chair: Albert M.K. Cheng*

**Deadline-Aware Interrupt Coalescing in Controller Area Network (CAN)**
*Christian Herber, Andre Richter, Thomas Wild and Andreas Herkersdorf*

**SmartMig: A Case for Page Migration and Self-interleaving for On-chip Distributed Memory Systems (SP)**
*Weiwei Fu, Yuan Mingmin, Li Liu and Minghui Wu.*

**A Temporal Partition-based Linux CPU Scheduler (SP)**
*Xingliang Zou, Albert M. K. Cheng, Yu Li and Yu Jiang*

**A Novel Fault Diagnosis in Reversible Logic Circuit (SP)**
*Bikromadittya Mondal and Susanta Chakraborty.*

## ICESS10: Hardware/Software Co-Design

*Thursday 15:00, L109*                                    *session chair: Gang Zeng*

**A Locality-Preserving Write Buffer Design for Page-Mapping Multichannel SSDs**
*Sheng-Min Huang and Li-Pin Chang*

**The RESCUE Approach – Towards Compositional Hardware/Software Co-Verification (SP)**
*Paula Herber*

**XGRID: A Scalable Many-Core Embedded Processor (SP)**
*Volkan Gunes and Tony Givargis*

**Advanced DSP Based Narrowband PLC Modem for Smart Grids Applications (Short Paper)**
*Mohamed Chaker Bali and Chiheb Rebai*

## ICESS11: Embedded Security

*Thursday 15:00, L107*                                    *session chair: Christian Krig*

**A Process for the Detection of Design-Level Hardware Trojans Using Verification Methods**
*Christian Krieg, Michael Rathmair and Florian Schupfer*

**An Efficient Admission Control Algorithm for Virtual Sensor Networks**
*Muhammad Ajmal Sawand, Stefano Paris, Zonghua Zhang and Farid Naït-Abdesselam*

**Wireless Video Sensor Network Platform and Its Application for Public Safety (SP)**
*Hyuntae Cho*

## THE 6TH INTERNATIONAL SYMPOSIUM ON CYBERSPACE SAFETY AND SECURITY (CSS 2014)

### CSS1: Full paper track

*Wednesday 10:30, L106*                                              *session chair: Zheng Yan*

**UI-Dressing to Detect Phishing**
  *Luigi Lo Iacono, Hoai Viet Nguyen, <u>Tobias Hirsch</u>, Maurice Baiers and Sebastian Möller*

**EP2AC: An Efficient Privacy-Preserving Data Access Control Scheme for Data-Oriented Wireless Sensor Networks**
  *Piyi Yang and <u>Tanveer Zia</u>*

**Snake: an End-to-End Encrypted Online Social Network**
  *Alessandro Barenghi, Michele Beretta, <u>Alessandro Di Federico</u> and Gerardo Pelosi*

### CSS2

*Wednesday 15:00, L106*                                              *session chair: Peter Muller*

**Robust Edge Based Image Steganography through Pixel Intensity Adjustment**
  *<u>Saiful Islam</u> and Phalguni Gupta*

**Online Taint Propagation Analysis System for Detecting Bugs in Binaries**
  *Gen Li, <u>Shuang-Xi Wang</u> and Ying Zhang*

**Data Interception through Broken Concurrency in Kernel Land**
  *<u>Julian Rrushi</u>*

### CSS3

*Wednesday 17:00, L106*                                              *session chair: Ioanna Dionysion*

**Out-of-Band Authentication Model with Hashcash Brute-Force Prevention**
  *George Violaris and <u>Ioanna Dionysiou</u>*

**A Secure Two-phase Data Deduplication Scheme**
  *<u>Pierre Meye</u>, Philippe Raïpin, Frédéric Tronel and Emmanuelle Anceaume*

**Bivariate non-Parametric Anomaly Detection**
  *<u>Christian Callegari</u>, Stefano Giordano and Michele Pagano*

### CSS4: short paper track

*Thursday 10:30, L106*                                              *session chair: Zia Tanveer*

**Security Mechanisms for a Cooperative Firewall**
  *<u>Hammad Kabir</u>, Raimo Kantola and Jesús Llorente Santos*

**Virtual firewall performance as a waypoint on a software defined overlay network**
  *Casimer Decusatis and <u>Peter Mueller</u>*

**Machine Learning based Cross-site Scripting Detection in Online Social Network**
  *<u>Rui Wang</u>, Xiaoqi Jia, Qinlei Li and Shengzhi Zhang*

## CSS5

**Asynchronous Covert Communication Using BitTorrent Trackers**
    *Mathieu Cunche, Mohamed Ali Kaafar and Roksana Boreli*

**Cloud Federation? We are not ready yet**
    *Jacques Bou Abdo, Jacques Demerjian, Hakima Chaouchi, Kabalan Barbar and Guy Pujolle*

**Proof of Retrieval and Ownership Protocols for Images through SPIHT Compression**
    *Fatema Rashid, Ali Miri, Isaac Woungang*

## WORKSHOPS AND WORKS IN PROGRESS

## AHPCN1: 6th International Symposium on Advances of High Performance Computing and Networking

*Friday 08:30, Main room*                                          *session chair: Martin Vigil*

**Online Performance Analysis: An Event-based Workflow Design Towards Exascale**
    *Michael Wagner, Tobias Hilbrich and Holger Brunst*

**Analysis of header usage patterns of HTTP request messages**
    *Maria Carla Calzarossa and Luisa Massari*

**Comparison of the Predictive Powers of Phenotypes Combined by Anthropometric Index and Triglyceride for Hypertension Diagnosis based on Data Mining**
    *Bum Ju Lee and Jong Yeol Kim*

**A speculative mechanism for barrier synchronization**
    *Tianzhou Chen, Meng Jinglei, Pan Ping, Yao Jun and Wu Minghui*

## AHPCN2: 6th International Symposium on Advances of High Performance Computing and Networking

*Friday 10:30, Main room*                                          *session chair: Imré Frotier*

**Extending K-scope Fortran Source Code Analyzer with Visualization of Performance Profiling Data and Remote Parsing of Source Code**
    *Masaaki Terai, Peter Bryzgalov, Toshiyuki Maeda and Kazuo Minami*

**Task-based programming for Seismic Imaging: Preliminary Results**
    *Lionel Boillot, George Bosilca, Emmanuel Agullo and Henri Calandra*

**A Performance Analysis of Long-Term Archiving Techniques**
    *Martin Vigil, Christian Weinert, Kjell Braden, Denise Demirel and Johannes Buchmann*

**Towards Self-aware Service Composition**
    *Abdessalam Elhabbash, Rami Bahsoon and Peter Tino.*

## Archi1: First International Workshop on Computing System Architectures

*Friday 08:30, L109*                                        *session chair: Pierre Guillot*

**Simulation of Asynchronous Iterative Algorithms Using SimGrid**
  *Charles Emile Ramamonjisoa, David Laiymani, Arnaud Giersch, Lilia Ziane Khodja and Raphaël Couturier*

**Hybrid Ontology-Based Matching for Distributed Discovery of SWS in P2P Systems**
  *Adel Boukhadra, Karima Benatchba and Amar Balla*

**Analyses on Performance of Gromacs in Hybird MPI+OpenMP+CUDA Cluster**
  *Wenbo Chen, Ce Li, Yang Zhang and Qifeng Bai*

## Archi2: First International Workshop on Computing System Architectures

*Friday 10:30, L109*                                        *session chair: Hakim Mabed*

**Optical Interconnects between Microprocessor and Memories**
  *Daxin Luo, Yaoda Liu, Xiaoying Liu, Bin Zhang, Gang Li, Qi Liao, Qinfen Hao and Zhulin Wei*

**Exploiting the Inter-cluster Record Reuse for Stream Processors**
  *Ying Zhang, Gen Li and Caixia Sun*

**Mobile computers as scientific computing machines**
  *Willem Smit and Ben Herbst*

## ALG&MOD: First International Workshop on Algorithmic and Modeling

*Friday 13:30, L109*                                        *session chair: Benoît Piranda*

**New Bounds of a Measure in Information Theory**
  *Mihaela-Alexandra Popescu, Oana Slusanschi, Alexandru-Corneliu Olteanu and Florin Pop*

**A Semantic Rule-Based Approach Supported by Process Mining for Personalised Adaptive Learning**
  *Kingsley Okoye, Abdel-Rahman H. Tawil, Usman Naeem, Rabih Bashroush and Elyes Lamine*

**SignalPU: A parallel and heterogeneous programming model for DSP applications**
  *Farouk Mansouri, Sylvain Huet and Dominique Houzet*

## App: First International Workshop on HPC Applications

*Friday 13:30, Main room*                                        *session chair: Hakim Mabed*

**Hide-as-you-Type: An Approach To Natural Language Steganography Through Sentence Modification**
  *Charles Clarke, Eckhard Pflügel and Dimitris Tsaptsinos*

**Experience Report: State-Replication-based Matching System**
  *Yiqun Ding, Bo Zhou, Fan Li, Wei Li, Xinyu Wang and Tong Wu*

**Real-time Environmental Monitoring for Cloud-based Hydrogeological Modeling with HydroGeoSphere**
  *Andrei Lapin, Eryk Schiller, Peter Kropf, Oliver Schilling, Philip Brunner, Almerima Jamakovic-Kapic, Torsten Braun, Sergio Maffioletti*

## AMDA1: First International Workshop on Advances in Memory and Data Access

*Friday 08:30, V106a* <span style="float:right">*session chair: Soraya Zertal*</span>

**Ex-Tmem: Extending Transcendent Memory with Non-volatile Memory for Virtual Machines**
*Vimalraj Venkatesan, Wei Qingsong and Tay Y. C.*

**A Bloom Filter Bank Based Hash Table for High Speed Packet Processing**
*Nicola Bonelli, Christian Callegari, Stefano Giordano and Gregorio Procissi*

**A Compiler translate Directive-based Language to Optimized CUDA**
*Feng Li, Hong An, Weihao Liang, Xiaoqiang Li, Yichao Cheng, Xia Jiang*

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## AMDA2: First International Workshop on Advances in Memory and Data Access

*Friday 10:30, V106a* <span style="float:right">*session chair: Christian Callegari*</span>

**Exploiting the fine grain SSD Internal Parallelism for OLTP and Scientific Workloads**
*Soraya Zertal*

**A Novel Approach for Fair and Secure Resource Allocation in Storage Cloud Architectures based on DRF mechanism**
*Maha Jebalia, Asma Ben Letaïfa, Mohamed Hamdi and Sami Tabbane*

**Evolution towards Distributed Storage in a Nutshell.**
*Pistirica Sorin Andrei, Asavei Victor, Geanta Horia, Moldoveanu Florica, Moldoveanu Alin, Negru Catalin, Mocanu Mariana*

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## O&S: First International Workshop on Optimization and Scheduling

*Friday 10:30, V106a* <span style="float:right">*session chair: Christian Callegari*</span>

**Core Affinity Code Block Schedule to Reduce Inter-Core Data Synchronization of SpMT**
*John Ye, Songyuan Li, Tianzhou Chen and Minghui Wu*

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## WCT1: First International Workshop on Cloud Technologies

*Friday 08:30, L106* <span style="float:right">*session chair: Guillaume Benissan*</span>

**Selective Task Scheduling for Time-targeted Workflow Execution on Cloud**
*In-Yong Jung and Chang-Sung Jeong*

**Towards an Easy-to-Use Web Application Server and Cloud PaaS for Web Development Education**
*Philipp Brune, Michael Leisner and Erica Janke*

**Cost-Optimized Resource Provision for Cloud Applications**
*Yuxi Shen, Haopeng Chen and Lingxuan Shen*

## WCT2: First International Workshop on Cloud Technologies
*Friday 10:30, L106*                                    *session chair: Philipp Brune*

**Trusted Platforms to secure Mobile Cloud Computing**
  *Thinh Le and Samia Bouzefrane*

**Clustering-based Query Result Authenticaion for Encrypted Databases in Cloud**
  *Miyoung Jang, Min Yoon, Deulnyeok Youn and Jae-Woo Chang*

**Cloud Brokerage Model for Resource Management**
  *Mohammad Aazam and Eui-Nam Huh*

**Analysis and Detection of DoS Attacks in Cloud Computing by Using QSE Algorithm**
  *Pallavali Radha Krishna Reddy and Samia Bouzefrane*

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## WCT3: First International Workshop on Cloud Technologies
*Friday 13:30, L106*                                    *session chair: Abal-Kassim Cheik Ahamed*

**Design and Implementation of a New Load Estimation Strategy in Cloud**
  *Sourav Banerjee, Prateep Bhattacharjee, Utpal Biswas and Mayukh Dey*

**A Density-aware Data Encryption Scheme for Outsourced Databases in Cloud Computing**
  *Min Yoon, Miyoung Jang, Young-Sung Shin and Jae-Woo Chang*

**Migrating Scientific Workflows to the Cloud**
  *Satish Narayana Srirama and Jaagup Viil*

**Service Level Agreement (SLA)-based Resource Management for Improving Cloud Services**
  *Kaiqi Xiong*

**Performance Characterization and Evaluation of WRF Model on Cloud and HPC Architectures**
  *Krishnan S. P. T., Bharadwaj Veeravalli, Hari Krishna Vetharenian and Chia Sheng Wu*

**A Coalitional Game-Theoretic Approach for QoS-based and Secure Data Storage in Cloud environment**
  *Maha Jebalia, Asma Ben Letaïfa, Mohamed Hamdi, Sami Tabbane*

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## GPU: First International Workshop on Graphical Processing Unit
*Friday 08:30, L107*                                    *session chair: Corinne Ancourt*

**On Implementing Sparse Matrix Multi-Vector Multiplication on GPUs**
  *Walid Abu-Sufah and Khalid Ahmad*

**Flexible Parallelized Empirical Mode Decomposition in CUDA for Hilbert Huang Transform**
  *Kevin P.-Y. Huang, Charles H.-P. Wen and Herming Chiueh*

**JolokiaC++ : A Annotation based Compiler Framework for GPGPUs**
  *Vibha Patel, Sanjeev Aggarwal and Amey Karkare*

**GPU Accelerated 3D Image Deformation Using Thin-Plate Splines**
  *Weixin Luo, Xuan Yang, Xiaoxiao Nan and Bingfeng Hu*

## M2A2_1: 6th Int. Workshop on Multicore and Multithreaded Architectures and Algorithms

*Friday 08:30, V106b*                                    *session chair: Kyprianos Papadimitriou*

**Fast and Accurate Code Placement of Embedded Software for Hybrid On-chip Memory Architecture**
*Zimeng Zhou,Lei Ju,Zhiping Jia, Xin Li*

**Dual-page mode: exploring parallelism in MLC flash SSDs**
*Yimo Du, Youtao Zhang and Xiao Nong*

**A Dynamically Adaptive Approach for Speculative Loop Execution in SMT Architectures**
*Meirong Li and Li Su*

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## M2A2_2: 6th Int. Workshop on Multicore and Multithreaded Architectures and Algorithms

*Friday 10:30, V106b*                                    *session chair: Xin Li*

**Embedded Multicore Processors and SIMD Instructions for Emotional-based Mobile Robotic Agents**
*Francisco Almenar Pedros, Carlos Dominguez, Juan-miguel Martínez, Houcine Hassan, Pedro Lopez*

**Security Effectiveness and a Hardware Firewall for MPSoCs**
*Miltos D Grammatikakis, Kyprianos Papadimitriou, Polydoros Petrakis, Antonis Papagrigoriou, George Kornaros, Ioannis Christoforakis, Marcello Coppola*

**Skeleton paradigm for developing e-science applications on distributed platforms**
*Mohamed Ben Belgacem, Nabil Abdennadher*

**Performance Characterization and Evaluation of HPC Algorithms on Dissimilar Multicore Architectures**
*Krishnan S. P. T. and Bharadwaj Veeravalli*

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## WNet1: Workshop on Wireless Network Technologies

*Friday 08:30, V128*                                    *session chair: Iwao Sasase*

**Two New Multicast Algorithms in 3D Mesh and Torus Networks**
*Hovhannes Harutyunyan and Shengjiang Wang*

**Optimizing a calibration software for radio astronomy**
*Souley Madougou, Ana L. Varbanescu and Rob van Nieuwpoort*

**Deterministic Blocker Tag Detection Scheme by Comparing Expected and Observed Slot Status in UHF RFID Inventory Management Systems**
*Ryo Hattori, Kentaroh Toyoda and Iwao Sasase*

**Improving Vertical Handover over Heterogeneous Technologies Using A Cross Layer Framework**
*Thaalbi Mariem and Tabbane Nabil*

## WNet2: Workshop on Wireless Network Technologies

*Friday 10:30, V128*                    *session chair: Hovhannes Harutyunyan*

**Throughput Enhancement in Cooperative Wireless Ad hoc Networks**
  *Muhammad Khalil Afzal, <u>Byung-Seo Kim</u> and Sung Won Kim*

**Bounding Worst-Case Inter-Core Communication Latency for CMPs with 2D-Mesh NoC**
  *Yiqiang Ding and <u>Wei Zhang</u>*

**Concurrent Moving-based Connection Restoration Scheme between Actors to Ensure the Continuous Connectivity in WSANs**
  *<u>Yuya Tamura</u>, Takuma Koga, Shinichiro Hara, Kentaroh Toyoda and Iwao Sasase*

## PPCSS 1: 6th Int. Symposium on Cyberspace Safety and Security Workshop

*Friday 08:30, V107*                    *session chair: Fabrizio Baiardi*

**Privacy Risks in Publication of Taxi GPS Data**
  *<u>Pei Pei Sui</u>, Tianyu Wo, Zhangle Wen and Xianxian Li*

**Security Evaluation for Cyber Situational Awareness,**
  *<u>Igor Kotenko</u> and Elena Doynikova*

**Predefined Honeypot Context Based Platform Independent Catering Honeypot System**
  *Wenjun Fan and David Fernández*

## PPCSS 2: 6th Int. Symposium on Cyberspace Safety and Security Workshop

*Friday 10:30, V107*                    *session chair: Igor Kotenko*

**NoteLocker: Simple Secure Storage Service**
  *Petros Zaris, <u>Harald Gjermundrød</u>*

**Assessing and Managing ICT Risk with Partial Information**
  *<u>Fabrizio Baiardi</u>, Alessandro Bertolini, R. Bertolotti, Fabio Corò, Federico Tonelli, Daniela Pestonesi.*

**What private information are you disclosing? A privacy-preserving system supervised by yourself**
  *Alberto Huertas Celdrán, Manuel Gil Pérez, Félix J. García Clemente, <u>Gregorio Martínez Pérez</u>*

**Efficient Privacy Preserving Multicast DNS Service Discovery**
  *<u>Daniel Kaiser</u> and Marcel Waldvogel*

## EMCA: Workshop on Embedded Multi-core Computing and Applications

*Friday 8:30, V127*                    *session chair: André Naz*

**An Embedded-Based Distributed Private Cloud: Power Quality Event Classification**
  *<u>Xiang-Yao Zheng</u>, Chia-Pang Chen, Joe-Air Jiang*

**Conductor Temperature Estimation Using the Hadoop MapReduce Framework for Smart Grid Applications**
  *<u>Sheng-Kai Pan</u>, Chia-Pang Chen, Joe-Air Jiang*

**Parallel Subcircuit Extraction Algorighm on GPGPUs**
  *<u>Che-Lun Hung</u>, Hsiao-Hsi Wang, Chun-Ting Fu, Chia-Shin Ou*

## ETD1: First International Workshop on HPC-CFD in Energy/ Transport Domains

*Friday 10:30, V127*                                    *session chair: Alain Refloch*

**Parallel 3D Sweep Kernel with PaRSEC**
*Salli Moustafa, Mathieu Faverge, Laurent Plagne, Pierre Ramet.*

**Numerical Verification of Large Scale CFD Simulations: One Way to Prepare the Exascale Challenge**
*Christophe Denis.*

**High performance Large Eddy Simulation of turbulent flows around PWR mixing grids**
*Calvin C., Bieder, U., Fauchet G. and Ledac P.*

## ETD2: First International Workshop on HPC-CFD in Energy/ Transport Domains

*Friday 13:30, V127*                                    *session chair: Christophe Calvin*

**Computational aspects of high order DGM as an enabling technology for LES of practical wall-bounded flows**
*Koen Hillewaert and C. Carton de Wiart*

**Task-Based Parallelization of Unstructured Meshes Assembly using D&C Strategy**
*Eric Petit, Loïc Thébault, Nathalie Möller, William Jalby and Quang Dinh*

**Some HPC challenges for multi-physics extended CFD computations**
*Vuillot François and Alain Refloch*

## WiP1: Work-in-Progress

*Friday 10:30, L107*                                    *session chair: Benoît Piranda*

**Deterministic L2 Cache Design and Its WCET Analysis**
*Jun Yan and Wei Zhang.*

**Iterative improvement methodology for Hardware/software co-synthesis of embedded systems based on genetic programming**
*Adam Górski and Maciej Ogorzałek.*

**ROP-EDF: Reservation-Based OP-EDF Scheduling for Automotive Data Stream Management System**
*Jaeyong Rho, Akihiro Yamaguchi, Kenya Sato, Takuya Azumi and Nobuhiko Nishio.*

**Bounding the Worst-Case Execution Time of Static NUCA Caches**
*Yiqiang Ding and Wei Zhang*

## WiP2: Work-in-Progress

*Friday 13:30, L107*                                    *session chair: Dominique Dhoutaut*

**Interaction between Human and Smart Objects via Twitter by Utilizing the Web-of-Things Concept**
*Andrea Giordano, Giandomenico Spezzano and Harry Sunarsa.*

**Static Worst Case Execution Time Analysis of Functional Reactive Systems**
*Zeinab Kazemi Alamouti and Albert M.K. Cheng.*

**An Assessment of Market Methods for Information Security Risk Management**
*Pankaj Pandey and Einar Arthur Snekkenes*

## HPCC 2014 Organizing and Program Committees

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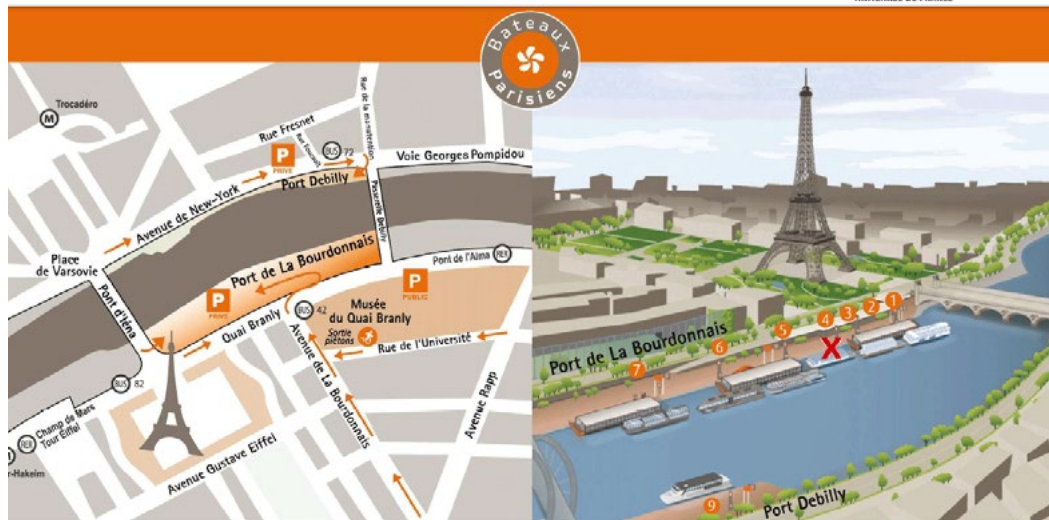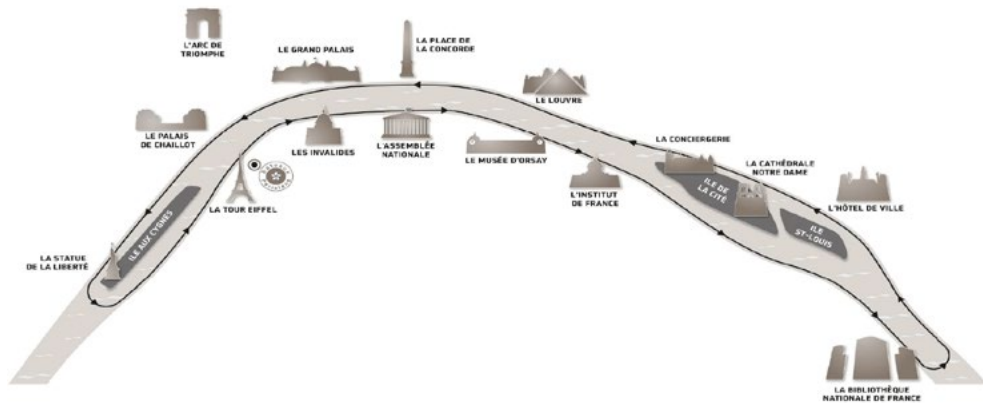
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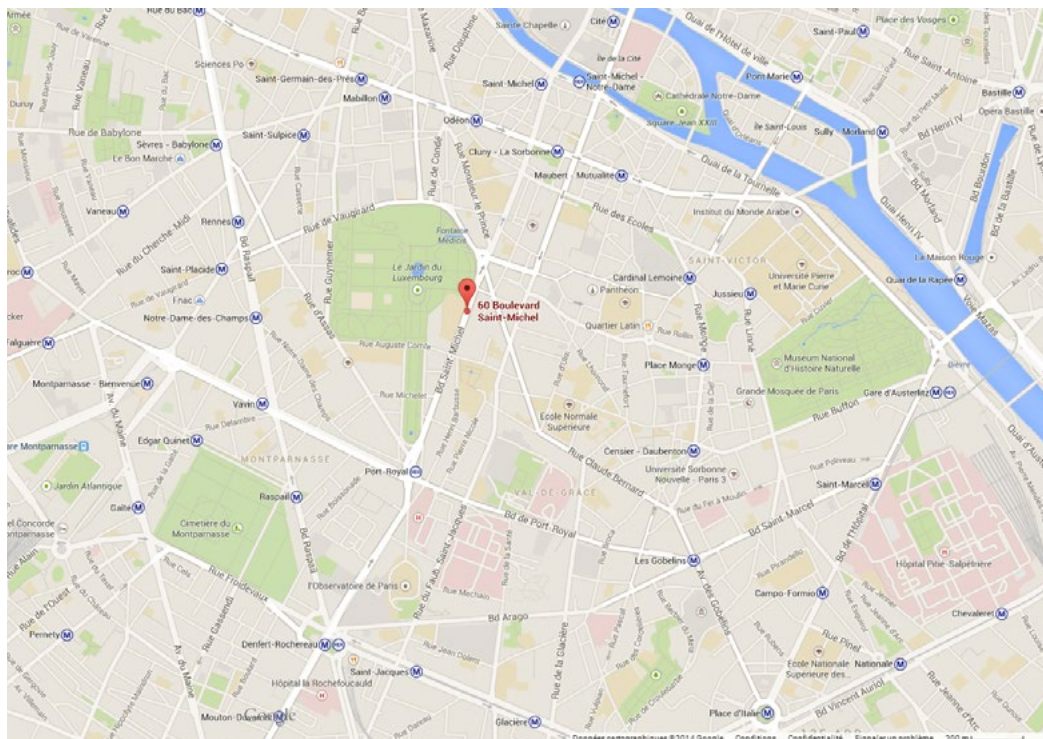www.bateauxparisiens.com
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To reach the conference site from the airport:
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Paris has two major airports «Roissy Charles de Gaulle» and «Orly» which are both within one hour of the conference by public transport (train or bus) and less by taxi. As for the railways, there are several big stations which generally are related to a particular region or direction where the trains head. All of them are located close to the city centre and hence close to the conference.

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Designed by Benoît Piranda, Femto-ST/DISC

# Throughput Enhancement in Cooperative Wireless Ad hoc Networks

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*Abstract*— **Next generation wireless networks are expected to provide services which require high performance and reliability. However, channel conditions in wireless networks can affect both throughput and reliability. Cooperative communication has the advantage of offering throughput enhancement and reliability in wireless networks by using several single-antenna nodes to form a virtual antenna array. The performance in cooperative communication depends on the relay selection scheme. Therefore, in this paper, we propose and evaluate a distributed relay-selection scheme based on the channel conditions of candidate relay nodes. Results show that our proposed-relay selection scheme increases the system throughput.**

*Keywords—cooperative communication; relay-selection; reliability; throughput;*

## I. INTRODUCTION

Cooperative communication has the advantage of offering throughput enhancement and reliability in wireless networks by using several single-antenna nodes to form a virtual antenna array [1]. However, performance from the media access control (MAC) protocol in cooperative wireless communications highly depends on the relay-selection mechanism [2].

Zhu and Cao [3] presented what they called a relay-enabled distributed coordination function (rDCF) protocol. They showed that rDCF can improve system performance. However, nodes frequently broadcast their willing list to their neighbor nodes, which may be unnecessary if a direct link between the source and destination nodes can support a higher data transmission rate. Shan et al. [4], overhearing nodes send out a "busy tone" according to their measured signal-to-noise ratios (SNRs). The relay, with the best channel condition sends a longer busy tone. However, this mechanism requires additional transceivers. In a method from Chen et al. [5], the source nodes include their residual power level in request-to-send (RTS) frames, allowing all overhearing nodes to estimate channel state information (CSI) and to make an optimal power allocation. In [6] Adam et al. studied relay-selection with explicit consideration of the energy required to receive the data. They proposed a relay-selection scheme that exhibits benefits with respect to energy efficiency. Each potential relay assesses the CSI and decides whether to participate in the

relay-selection process or not. Brandner et al. [7] proposed a contention-based distributed node-selection mechanism. The aim of the proposed random access mechanism is to maximize success probability and reduce signaling overhead in terms of reply messages sent by candidate nodes. Blestsas et al. [8] proposed opportunistic relay (OR) schemes. Each potential relay can overhear the RTS and clear-to-send (CTS) frames between transmitter and receiver. All potential relays can deduce the channel quality from the strength of the RTS/CTS frames and start a timer based on instantaneous channel measurement. The timer of the relay with the best end-to-end channel conditions will expire first, and that relay node transmits a short duration flag packet, signaling its presence to all other relay nodes. Abouelseoud and Nosratinia [9] proposed heterogeneous relay networks where relays with different protocols co-exist. A heterogeneous network may contain both decode-and-forward (DF) relays and amplify-and-forward (AF) relays. However, the authors assumed that the CSI is available to all relays.
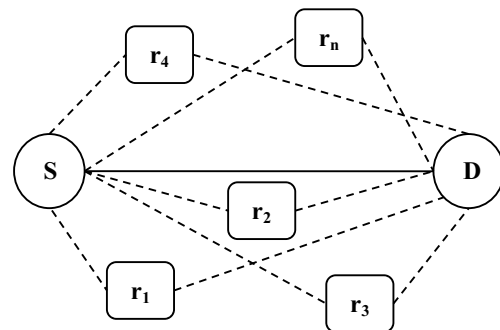


Fig. 1. Cooperative ad hoc system model

This paper proposes a distributed relay-selection method which helps to improve the system throughput. The basic concept of the method is to select a node with better link reliability as the relay. Nodes with a high SNR between source and destination nodes are well-suited for selection and are thus preferred in the random channel access mechanism. We considered the widely adopted IEEE 802.11 wireless standard's contention mechanism [10] for performance evaluation, compared to previous work in the same area. The

relay nodes that operate under our proposed algorithm do not always need to maintain a listening mode. Instead, only the node being compared against the threshold needs to be turned on.

The remainder of this paper is organized as follows. Section II first provides the system model and then explains the proposed SNR-based relay-selection scheme. Section III explains the performance evaluation, and finally, Section IV concludes the paper.

## II. PROPOSED RELAY-SELECTION SCHEME

### A. Syetm Model

The target system in the paper is based on IEEE802.11 standard-based ad-hoc networks and example topology of the system is shown in Fig 1. IEEE 802.11 supports multiple transmission rates depending on the SNR [11]. The system model consists of source node, $S$, destination node, $D$, and $n$ relay node. The relay nodes and destination are assumed not to have their own traffic. Source/destination nodes are randomly chosen, and the other nodes serve as relays. Assume that source, destination, and potential relay nodes are always within communication range of each other. There might be the direct link between source and destination nodes (marked as a solid line in Fig. 1). If the channel condition of direct link is not good enough, relay nodes can help the sender to transmit the data at a higher data rate than with the direct link. The channels between each transmission pair are assumed to be independent of each other. Nodes are uniformly distributed over the network area.

### B. Proposed Protocol

When a source node cannot reach to a destination node, it transmits a relay-request message to neighbor nodes. The message includes information on the destination node. Any node receiving the request message checks if SNR of the link between the node itself and destination node is higher than a predefined threshold value. If it finds the SNR is higher than the threshold, it sends a response message back to the source node. Then, the node will forwards data packet from the source node to the destination node. It is possible for multiple neighbor nodes to receive the relay-request message. In this case, the nodes that try to send a response may experience collisions. In addition, there is no guarantee the node having the best link reliability with the source and the destination nodes sends its relay response message earlier than others having less reliability. In order to set a reliable communication path, it is necessary for the node having the best channel quality with the source and destination nodes to be selected as a relay. Therefore, to give priority to the node that has the better link reliability, neighbor nodes receiving the relay-request message randomly choose backoff time slots between 1 and $2^m$ and send relay reply messages after waiting for the chosen time slots. The $m$ is obtained as a function of the SNR of the link as follows:

$$m = M - \left\lfloor \frac{\gamma - SNR_{min}}{\Delta snr} \right\rfloor, \quad if \; \gamma \geq SNR_{min}, \qquad (1)$$

where $M$ is the maximum number of $m$, $\Delta snr$ is a unit of $SNR$, which is obtained from dividing $SNR$ values between maximum $SNR$ and minimum $SNR$ ($SNR_{min}$) by $M$, respectively, required to determine the system bit error rate (BER). $\gamma$ is defined as $\alpha SNR_S + (1 - \alpha)SNR_D$, where $\alpha$ is a system design parameter, $SNR_S$ and $SNR_D$ are SNRs of the link between the candidate relay node and source node, and between the candidate relay node and destination node, respectively. If $\gamma < SNR_{min}$, then the node cannot participate in relay selection. The first one node that sends the relay response message is selected as the relay whereas by overhearing the relay response message, other nodes stop sending relay response messages. When the source and the destination nodes receive the relay response message, they know which node is selected as a relay. If a relay response message is not received within the timeout period, the source node begins direct transmission.

TABLE 1. Parameter Values

| Parameter | Value |
| --- | --- |
| CWmin | 15 |
| CWmax | 1023 |
| SIFS | 16 μsec |
| DIFS | 34 μsec |
| Slot time | 9 μsec |
| MAC header | 24 bytes |
| PLCP preamble | 16 μsec |
| ACK duration | 44 μsec |
| RTS time | 52 μsec |
| CTS time | 44 μsec |
| Packet payload | 8192 bits |

TABLE 2: SNR versus data rate of IEEE 802.11a

| SNR | Data rate |
| --- | --- |
| 25 | 6 Mbps |
| 27 | 9 Mbps |
| 30 | 12 Mbps |
| 32 | 18 Mbps |
| 35 | 24 Mbps |
| 40 | 36 Mbps |
| 42 | 48 Mbps |
| 45 | 54 Mbps |

## III. PERFORMANCE EVALUATION

To evaluate the performance of the proposed scheme, we compared throughput performance of the proposed relay-selection method with that of relay-enabled DCF-based MAC protocol (for simplicity, hereinafter we refer to relay-enabled DCF-based MAC protocol as relay-enabled MAC) using Matlab simulator.

Simulations are carried under saturation condition such that a source always has a packet to transmit in his buffer. The system parameters are shown in Table 1 and are based on the orthogonal frequency division multiplexing (OFDM) physical

layer used in the IEEE 802.11a standard. We consider the IEEE 802.11 a physical (PHY) layer, which can support 8 different data rates up to 54 Mbps. However, the idea will work with others PHY layer standards as well. Control packets and headers (RTS, CTS, PHY, and MAC headers) are transmitted at a basic rate of 1Mbps. The supported data rate between two nodes depends on the average received SNR, which is mainly a function of several factors such as distance, frequency, propagation environment [12]. Table 2 shows the supported rates depending on SNR [11].
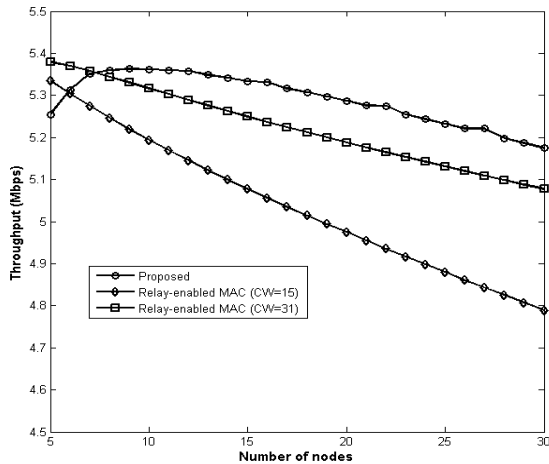


Fig. 2. Throughput as a function of the number of nodes (Max SNR=40 dB, Min SNR=20 dB).
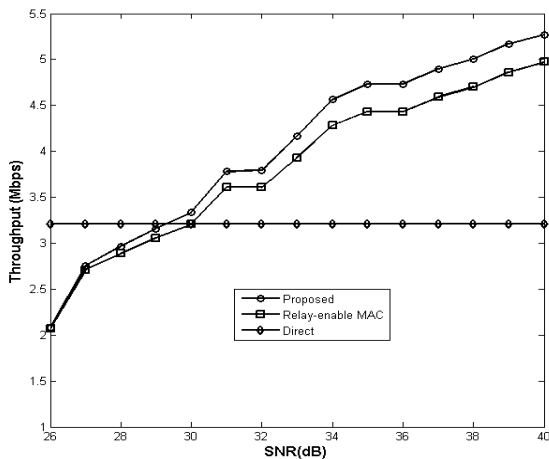


Fig. 3. Impact of channel condition on throughput with 20 nodes.

Fig. 2 presents throughput performance versus the number of nodes, with different values for the contention window under relay-enabled MAC and the non-cooperative protocol. The value of the contention window in the proposed method is chosen according to the channel condition. As shown in Fig. 2, the proposed protocol outperforms relay-enabled DCF because

the selected relay has a better link reliability than the direct path and provides a higher data rate than the direct path. When we increase the number of nodes, throughput decreases because collision probability increases, and nodes experience a longer backoff duration, which results in a reduction in throughput.

Fig. 3 shows the impact of SNR on throughput. Since the data rate under the non-cooperative protocol is fixed at 6 Mbps, throughput is constant, regardless of SNR, under the error-free channel. However, under the proposed protocol and relay-enabled MAC, throughput increases as SNR increases. Furthermore, we see in Fig. 3 that the proposed protocol shows higher throughput than relay-enabled MAC. This performance gain in the proposed protocol, compared to relay-enabled MAC, comes from the higher data rate supported by the selected relay under the proposed protocol. Moreover, we observed that at low SNR, the transmission rates of the direct path and the relay path are similar. However, the relay path required two transmissions to deliver data to the destination, which caused the lower throughput under the proposed protocol and under relay-enabled DCF MAC than with the direct path.

## IV. CONCLUSION

In cooperative communications, selecting the best relay node is an essential factor to improve network performances. In this paper, we proposed an SNR-based relay selection scheme. In the scheme, a node that has the better links between the node and a source and between the node and a destination has a higher opportunity to become a relay node. This is achieved by associating channel conditions of link with backoff time procedure. Extensive simulation results show that the proposed scheme increases system throughput when we increase the number of candidate relay nodes.

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