

LNCS 4138

Xiuzhen Cheng
Wei Li
Taieb Znati (Eds.)

Wireless Algorithms, Systems, and Applications

First International Conference, WASA 2006
Xi'an, China, August 2006
Proceedings



Springer

TN92-53
W312
2006

Xiuzhen Cheng Wei Li Taieb Znati (Eds.)

Wireless Algorithms, Systems, and Applications

First International Conference, WASA 2006
Xi'an, China, August 15-17, 2006
Proceedings



Springer



E200604014

Volume Editors

Xiuzhen Cheng
The George Washington University
Department of Computer Science
801 22nd Street NW, Suite 704, Washington DC 20052, USA
E-mail: cheng@gwu.edu

Wei Li
The University of Toledo
Department of Electrical Engineering and Computer Science
2801 W. Bancroft St., Toledo, OH 43606-3390, USA
E-mail: wli@eecs.utoledo.edu

Taieb Znati
University of Pittsburgh
Computer Science Department
Pittsburgh, PA 15260, USA
E-mail: znati@cs.pitt.edu

Library of Congress Control Number: Applied for

CR Subject Classification (1998): F.1, F.2, D.1, D.2, D.4, C.2, C.4, H.4

LNCS Sublibrary: SL 1 – Theoretical Computer Science and General Issues

ISSN	0302-9743
ISBN-10	3-540-37189-3 Springer Berlin Heidelberg New York
ISBN-13	978-3-540-37189-2 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media
springer.com

© Springer-Verlag Berlin Heidelberg 2006
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11814856 06/3142 5 4 3 2 1 0

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Moshe Y. Vardi

Rice University, Houston, TX, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Lecture Notes in Computer Science

For information about Vols. 1–4020

please contact your bookseller or Springer

Vol. 4144: T. Ball, R.B. Jones (Eds.), *Computer Aided Verification*. XV, 564 pages. 2006.

Vol. 4139: T. Salakoski, F. Ginter, S. Pyysalo, T. Pahikkala (Eds.), *Advances in Natural Language Processing*. XIV, 771 pages. 2006. (Sublibrary LNAI).

Vol. 4138: X. Cheng, W. Li, T. Znati (Eds.), *Wireless Algorithms, Systems, and Applications*. XVI, 709 pages. 2006.

Vol. 4127: E. Damiani, P. Liu (Eds.), *Data and Applications Security XX*. X, 319 pages. 2006.

Vol. 4121: A. Biere, C.P. Gomes (Eds.), *Theory and Applications of Satisfiability Testing - SAT 2006*. XII, 438 pages. 2006.

Vol. 4115: D.-S. Huang, K. Li, G.W. Irwin (Eds.), *Computational Intelligence and Bioinformatics, Part III*. XXI, 803 pages. 2006. (Sublibrary LNBI).

Vol. 4114: D.-S. Huang, K. Li, G.W. Irwin (Eds.), *Computational Intelligence, Part II*. XXVII, 1337 pages. 2006. (Sublibrary LNAI).

Vol. 4113: D.-S. Huang, K. Li, G.W. Irwin (Eds.), *Intelligent Computing, Part I*. XXVII, 1331 pages. 2006.

Vol. 4112: D.Z. Chen, D. T. Lee (Eds.), *Computing and Combinatorics*. XIV, 528 pages. 2006.

Vol. 4111: F.S. de Boer, M.M. Bonsangue, S. Graf, W.-P. de Roever (Eds.), *Formal Methods for Components and Objects*. VIII, 447 pages. 2006.

Vol. 4109: D.-Y. Yeung, J.T. Kwok, A. Fred, F. Roli, D. de Ridder (Eds.), *Structural, Syntactic, and Statistical Pattern Recognition*. XXI, 939 pages. 2006.

Vol. 4108: J.M. Borwein, W.M. Farmer (Eds.), *Mathematical Knowledge Management*. VIII, 295 pages. 2006. (Sublibrary LNAI).

Vol. 4106: T.R. Roth-Berghofer, M.H. Göker, H. A. Güvenir (Eds.), *Advances in Case-Based Reasoning*. XIV, 566 pages. 2006. (Sublibrary LNAI).

Vol. 4104: T. Kunz, S.S. Ravi (Eds.), *Ad-Hoc, Mobile, and Wireless Networks*. XII, 474 pages. 2006.

Vol. 4099: Q. Yang, G. Webb (Eds.), *PRICAI 2006: Trends in Artificial Intelligence*. XXVIII, 1263 pages. 2006. (Sublibrary LNAI).

Vol. 4098: F. Pfenning (Ed.), *Term Rewriting and Applications*. XIII, 415 pages. 2006.

Vol. 4097: X. Zhou, O. Sokolsky, L. Yan, E.-S. Jung, Z. Shao, Y. Mu, D.C. Lee, D. Kim, Y.-S. Jeong, C.-Z. Xu (Eds.), *Emerging Directions in Embedded and Ubiquitous Computing*. XXVII, 1034 pages. 2006.

Vol. 4096: E. Sha, S.-K. Han, C.-Z. Xu, M.H. Kim, L.T. Yang, B. Xiao (Eds.), *Embedded and Ubiquitous Computing*. XXIV, 1170 pages. 2006.

Vol. 4094: O. H. Ibarra, H.-C. Yen (Eds.), *Implementation and Application of Automata*. XIII, 291 pages. 2006.

Vol. 4093: X. Li, O.R. Zaiane, Z. Li (Eds.), *Advanced Data Mining and Applications*. XXI, 1110 pages. 2006. (Sublibrary LNAI).

Vol. 4092: J. Lang, F. Lin, J. Wang (Eds.), *Knowledge Science, Engineering and Management*. XV, 664 pages. 2006. (Sublibrary LNAI).

Vol. 4091: G.-Z. Yang, T. Jiang, D. Shen, L. Gu, J. Yang (Eds.), *Medical Imaging and Augmented Reality*. XIII, 399 pages. 2006.

Vol. 4090: S. Spaccapietra, K. Aberer, P. Cudré-Mauroux (Eds.), *Journal on Data Semantics VI*. XI, 211 pages. 2006.

Vol. 4088: Z.-Z. Shi, R. Sadananda (Eds.), *Agent Computing and Multi-Agent Systems*. XVII, 827 pages. 2006. (Sublibrary LNAI).

Vol. 4085: J. Misra, T. Nipkow, E. Sekerinski (Eds.), *FM 2006: Formal Methods*. XV, 620 pages. 2006.

Vol. 4079: S. Etalle, M. Truszczyński (Eds.), *Logic Programming*. XIV, 474 pages. 2006.

Vol. 4077: M.-S. Kim, K. Shimada (Eds.), *Advances in Geometric Modeling and Processing*. XVI, 696 pages. 2006.

Vol. 4076: F. Hess, S. Pauli, M. Pohst (Eds.), *Algorithmic Number Theory*. X, 599 pages. 2006.

Vol. 4075: U. Leser, F. Naumann, B. Eckman (Eds.), *Data Integration in the Life Sciences*. XI, 298 pages. 2006. (Sublibrary LNBI).

Vol. 4074: M. Burmester, A. Yasinsac (Eds.), *Secure Mobile Ad-hoc Networks and Sensors*. X, 193 pages. 2006.

Vol. 4073: A. Butz, B. Fisher, A. Krüger, P. Olivier (Eds.), *Smart Graphics*. XI, 263 pages. 2006.

Vol. 4072: M. Harders, G. Székely (Eds.), *Biomedical Simulation*. XI, 216 pages. 2006.

Vol. 4071: H. Sundaram, M. Naphade, J.R. Smith, Y. Rui (Eds.), *Image and Video Retrieval*. XII, 547 pages. 2006.

Vol. 4070: C. Priami, X. Hu, Y. Pan, T.Y. Lin (Eds.), *Transactions on Computational Systems Biology V*. IX, 129 pages. 2006. (Sublibrary LNBI).

Vol. 4069: F.J. Perales, R.B. Fisher (Eds.), *Articulated Motion and Deformable Objects*. XV, 526 pages. 2006.

Vol. 4068: H. Schärfe, P. Hitzler, P. Ørstrøm (Eds.), *Conceptual Structures: Inspiration and Application*. XI, 455 pages. 2006. (Sublibrary LNAI).

Vol. 4067: D. Thomas (Ed.), *ECOOP 2006 – Object-Oriented Programming*. XIV, 527 pages. 2006.

- Vol. 4066: A. Rensink, J. Warmer (Eds.), Model Driven Architecture – Foundations and Applications. XII, 392 pages. 2006.
- Vol. 4065: P. Perner (Ed.), Advances in Data Mining. XI, 592 pages. 2006. (Sublibrary LNAI).
- Vol. 4064: R. Büschkes, P. Laskov (Eds.), Detection of Intrusions and Malware & Vulnerability Assessment. X, 195 pages. 2006.
- Vol. 4063: I. Gotton, G.T. Heineman, I. Crnkovic, H.W. Schmidt, J.A. Stafford, C.A. Szyperski, K. Wallnau (Eds.), Component-Based Software Engineering. XI, 394 pages. 2006.
- Vol. 4062: G. Wang, J.F. Peters, A. Skowron, Y. Yao (Eds.), Rough Sets and Knowledge Technology. XX, 810 pages. 2006. (Sublibrary LNAI).
- Vol. 4061: K. Miesenberger, J. Klaus, W. Zagler, A. Karshmer (Eds.), Computers Helping People with Special Needs. XXIX, 1356 pages. 2006.
- Vol. 4060: K. Futatsugi, J.-P. Jouannaud, J. Meseguer (Eds.), Algebra, Meaning, and Computation. XXXVIII, 643 pages. 2006.
- Vol. 4059: L. Arge, R. Freivalds (Eds.), Algorithm Theory – SWAT 2006. XII, 436 pages. 2006.
- Vol. 4058: L.M. Batten, R. Safavi-Naini (Eds.), Information Security and Privacy. XII, 446 pages. 2006.
- Vol. 4057: J.P.W. Pluim, B. Likar, F.A. Gerritsen (Eds.), Biomedical Image Registration. XII, 324 pages. 2006.
- Vol. 4056: P. Flocchini, L. Gasieniec (Eds.), Structural Information and Communication Complexity. X, 357 pages. 2006.
- Vol. 4055: J. Lee, J. Shim, S.-g. Lee, C. Bussler, S. Shim (Eds.), Data Engineering Issues in E-Commerce and Services. IX, 290 pages. 2006.
- Vol. 4054: A. Horváth, M. Telek (Eds.), Formal Methods and Stochastic Models for Performance Evaluation. VIII, 239 pages. 2006.
- Vol. 4053: M. Ikeda, K.D. Ashley, T.-W. Chan (Eds.), Intelligent Tutoring Systems. XXVI, 821 pages. 2006.
- Vol. 4052: M. Bugliesi, B. Preneel, V. Sassone, I. Wegener (Eds.), Automata, Languages and Programming, Part II. XXIV, 603 pages. 2006.
- Vol. 4051: M. Bugliesi, B. Preneel, V. Sassone, I. Wegener (Eds.), Automata, Languages and Programming, Part I. XXIII, 729 pages. 2006.
- Vol. 4049: S. Parsons, N. Maudet, P. Moraitis, I. Rahwan (Eds.), Argumentation in Multi-Agent Systems. XIV, 313 pages. 2006. (Sublibrary LNAI).
- Vol. 4048: L. Goble, J.-J.C. Meyer (Eds.), Deontic Logic and Artificial Normative Systems. X, 273 pages. 2006. (Sublibrary LNAI).
- Vol. 4047: M. Robshaw (Ed.), Fast Software Encryption. XI, 434 pages. 2006.
- Vol. 4046: S.M. Astley, M. Brady, C. Rose, R. Zwiggelaar (Eds.), Digital Mammography. XVI, 654 pages. 2006.
- Vol. 4045: D. Barker-Plummer, R. Cox, N. Swoboda (Eds.), Diagrammatic Representation and Inference. XII, 301 pages. 2006. (Sublibrary LNAI).
- Vol. 4044: P. Abrahamsson, M. Marchesi, G. Succì (Eds.), Extreme Programming and Agile Processes in Software Engineering. XII, 230 pages. 2006.
- Vol. 4043: A.S. Atzeni, A. Liroy (Eds.), Public Key Infrastructure. XI, 261 pages. 2006.
- Vol. 4042: D. Bell, J. Hong (Eds.), Flexible and Efficient Information Handling. XVI, 296 pages. 2006.
- Vol. 4041: S.-W. Cheng, C.K. Poon (Eds.), Algorithmic Aspects in Information and Management. XI, 395 pages. 2006.
- Vol. 4040: R. Reulke, U. Eckardt, B. Flach, U. Knauer, K. Polthier (Eds.), Combinatorial Image Analysis. XII, 482 pages. 2006.
- Vol. 4039: M. Morisio (Ed.), Reuse of Off-the-Shelf Components. XIII, 444 pages. 2006.
- Vol. 4038: P. Ciancarini, H. Wiklicky (Eds.), Coordination Models and Languages. VIII, 299 pages. 2006.
- Vol. 4037: R. Gorrieri, H. Wehrheim (Eds.), Formal Methods for Open Object-Based Distributed Systems. XVII, 474 pages. 2006.
- Vol. 4036: O. H. Ibarra, Z. Dang (Eds.), Developments in Language Theory. XII, 456 pages. 2006.
- Vol. 4035: T. Nishita, Q. Peng, H.-P. Seidel (Eds.), Advances in Computer Graphics. XX, 771 pages. 2006.
- Vol. 4034: J. Münch, M. Vierimaa (Eds.), Product-Focused Software Process Improvement. XVII, 474 pages. 2006.
- Vol. 4033: B. Stiller, P. Reichl, B. Tuffin (Eds.), Performance Has its Price. X, 103 pages. 2006.
- Vol. 4032: O. Etzion, T. Kuflik, A. Motro (Eds.), Next Generation Information Technologies and Systems. XIII, 365 pages. 2006.
- Vol. 4031: M. Ali, R. Dapoigny (Eds.), Advances in Applied Artificial Intelligence. XXIII, 1353 pages. 2006. (Sublibrary LNAI).
- Vol. 4029: L. Rutkowski, R. Tadeusiewicz, L.A. Zadeh, J.M. Zurada (Eds.), Artificial Intelligence and Soft Computing – ICAISC 2006. XXI, 1235 pages. 2006. (Sublibrary LNAI).
- Vol. 4028: J. Kohlas, B. Meyer, A. Schiper (Eds.), Dependable Systems: Software, Computing, Networks. XII, 295 pages. 2006.
- Vol. 4027: H.L. Larsen, G. Pasi, D. Ortiz-Arroyo, T. Andreassen, H. Christiansen (Eds.), Flexible Query Answering Systems. XVIII, 714 pages. 2006. (Sublibrary LNAI).
- Vol. 4026: P.B. Gibbons, T. Abdelzaher, J. Aspnes, R. Rao (Eds.), Distributed Computing in Sensor Systems. XIV, 566 pages. 2006.
- Vol. 4025: F. Eliassen, A. Montresor (Eds.), Distributed Applications and Interoperable Systems. XI, 355 pages. 2006.
- Vol. 4024: S. Donatelli, P.S. Thiagarajan (Eds.), Petri Nets and Other Models of Concurrency - ICATPN 2006. XI, 441 pages. 2006.
- Vol. 4021: E. André, L. Dybkjær, W. Minker, H. Neumann, M. Weber (Eds.), Perception and Interactive Technologies. XI, 217 pages. 2006. (Sublibrary LNAI).

Preface

The papers in this volume were presented at the First Annual International Conference on Wireless Algorithms, Systems, and Applications (WASA 2006), held on August 15-17, 2006, in Xi'an, China. The Program Committee selected 63 papers from a large number of submissions.

WASA 2006 was motivated by the recent advances in cutting-edge electronic and computer technologies that have paved the way for the proliferation of ubiquitous infrastructure and infrastructureless wireless networks. The objective of this conference was to address the research and development efforts of various issues in the area of algorithms, systems and applications for current and next-generation infrastructure and infrastructureless wireless networks. The conference was structured to provide a forum for researchers and practitioners, from the academic, industrial and governmental sectors, with a unique opportunity to discuss and express their views on the current trends, challenges, and state-of-the-art solutions addressing various issues related to current and next generation wireless networks.

WASA 2006 was the result of the hard work of a large group of renowned researchers from around the world. We would like to take this opportunity to thank all the Executive Committee members and the Technical Committee members. We would also like to express our gratitude towards our keynote speakers and panelists.

We would like to thank the Program Co-chairs, Xiuzhen Cheng of The George Washington University, Wei Li of The University of Toledo, and Taieb Znati of University of Pittsburgh, for their dedicated efforts towards the success of this conference. Our thanks are also due to the Finance Chair Xudong Hu of the Chinese Academy of Sciences, the Local Chair Jiangshe Zhang of Xi'an Jiaotong University, and the Publication Chair Fang Liu of The George Washington University.

Finally, we would like to express our special gratitude to our sponsors, The Chinese Academy of Sciences, The Operations Research Society of China, and Xi'an Jiaotong University, and the IEEE Technical Committee on Distributed Processing. Last, but not the least, we thank all the attendees for making this conference a success.

June 2006

Dingzhu Du and Wei Zhao
General Co-chairs
WASA 2006

Message from the Program Co-chairs

Welcome to the proceedings of the 2006 International Conference on Wireless Algorithms, System, and Applications (WASA 2006). This year's conference was the first conference in its series to address visionary approaches and future research directions dealing with effective and efficient state-of-the-art algorithm design and analysis, reliable and secure system development and implementations, experimental study and test bed validation, and new application exploration in wireless networks.

In just its first year, WASA received a large number of quality submissions from 19 countries. Each submission was assigned by the Program Co-chairs to obtain at least three reviews. Accepted papers represent state-of-the-art work in the area of algorithms, systems and applications for current and next-generation infrastructure and infrastructureless wireless networks, including mobility, localization, topology control, security, broadcast/multicast routing, data management, MAC, pervasive computing, modeling and system design. The conference was organized into 2 keynote sessions and 12 technical sessions. Also, we had a panel session with panellists invited from the National Science Foundation of the United States and academia. Two keynote speakers were invited from academia to provide a comprehensive and balanced view of a variety of issues engaged in wireless networking.

We are grateful to all those individuals whose dedicated work made WASA 2006 a successful and valuable conference. We would like to express our sincere gratitude to the TPC members for their excellent job in handling the review process, to all the panelists for their participation, and to the General Co-chairs Ding-Zhu Du and Wei Zhao for their support and hard work. We would also like to express our appreciation to all the authors for their contributions.

June 2006

Xiuzhen Cheng, Wei Li, and Taieb Znati
Program Co-chairs
WASA 2006

Organization

General Co-chairs

Dingzhu Du (University of Texas at Dallas, Xi'an Jiaotong University)
Wei Zhao (Texas A&M University, National Science Foundation, USA)

Program Co-chairs

Xiuzhen Cheng (The George Washington University, USA)
Wei Li (The University of Toledo, USA)
Taieb Znati (University of Pittsburgh, USA)

Finance Chair

Xudong Hu (Chinese Academy of Sciences, China)

Local Chair

Jiangshe Zhang (Xi'an Jiaotong University, China)

Publication Chair

Fang Liu (The George Washington University, USA)

Technical Committee Members

Dharma Agrawal (University of Cincinnati, USA)
Kemal Akkaya (Southern Illinois University Carbondale, USA)
Attahiru Alfa (University of Manitoba, Canada)
Jun Cai (University of Waterloo, Canada)
Feng Cao (Cisco Systems, USA)
Zhenfu Cao (Shanghai Jiaotong University, China)
Ionut Cardei (Florida Atlantic University, USA)
Mihaela Cardei (Florida Atlantic University, USA)
Han-Chieh Chao (National Ilan University, Taiwan)
Shigang Chen (University of Florida, USA)
Shu-Ching Chen (Florida International University, USA)
Songqing Chen (George Mason University, USA)

Tzung-Shi Chen (National University of Tainan, Taiwan)
 Xiang Chen (Motorola Labs, USA)
 YangQuan Chen (Utah State University, USA)
 Yen-Wen Chen (National Central University, Taiwan)
 Liang Cheng (NVIDIA Corp., USA)
 Maggie Cheng (University of Missouri, Rolla, USA)
 Xiaowen Chu (Hong Kong Baptist University, Hong Kong, China)
 Jun-Hong Cui (University of Connecticut, USA)
 Yong Cui (Tsinghua University, China)
 Swades De (New Jersey Institute of Technology, USA)
 Jing Deng (University of New Orleans, USA)
 Qiang Duan (University of Central Arkansas, USA)
 Zhenhai Duan (Florida State University, USA)
 Schahram Dustdar (Vienna University of Technology, Austria)
 Gang Feng (Nanyang Technological University, Singapore)
 Xinwen Fu (Dakota State University, USA)
 Yunghsiang Han (National Taipei University, Taiwan)
 Chih-Hao Huang (City University of Hong Kong, Hong Kong, China)
 Qingfeng Huang (Palo Alto Research Center (PARC), USA)
 Xiaohua Jia (City University of Hong Kong, Hong Kong, China)
 Mehdi Kalantari Khandani (University of Maryland, USA)
 Peter Langendoerfer (IHP Microelectronics, Germany)
 Cheuk Lung Lau (Pontifical Catholic University of Paraná, Brazil)
 Bo Li (Hong Kong Univ. of Science and Technology, Hong Kong, China)
 Jason H. Li (Intelligent Automation Inc., USA)
 Jiang Li (Howard University, USA)
 Jie Li (University of Tsukuba, Japan)
 Qun Li (College of William and Mary, USA)
 XiangYang Li (Illinois Institute of Technology, USA)
 Xinrong Li (University of North Texas, USA)
 Yingshu Li (Georgia State University, USA)
 Qilian Liang (University of Texas at Arlington, USA)
 Yibei Ling (Applied Research Laboratories, Telcordia Technologies, USA)
 Alex Zhaoyu Liu (University of North Carolina at Charlotte, USA)
 Fang Liu (The George Washington University, USA)
 Jiangchuan Liu (Simon Fraser University, Canada)
 Zikuan Liu (University of Moncton, Canada)
 Wenjing Lou (Worcester Polytechnic Institute, USA)
 Sanglu Lu (Nanjing University, China)
 John C.S. Lui (The Chinese University of Hong Kong, Hong Kong, China)
 Liran Ma (The George Washington University, USA)
 Maurice Mulvenna (University of Ulster, UK)
 Nidal Nasser (University of Guelph, Canada)
 Keivan Navaie (Carleton University, Canada)
 Hung Ngo (SUNY at Buffalo, USA)

Yi Pan (Georgia State University, USA)
Symeon Papavassiliou (National Technical University of Athens, Greece)
Yi Qian (University of Puerto Rico at Mayaguez, Puerto Rico, USA)
Jian Ren (Michigan State University, USA)
Prasan Kumar Sahoo (Vanung University, Taiwan)
Kamil Sarac (University of Texas at Dallas, USA)
Wen-Zhan Song (Washington State University, USA)
Bo Sun (Lamar University, USA)
Willy Susilo (University of Wollongong, Australia)
My Thai (University of Texas at Dallas, USA)
Ali Tosun (University of Texas at San Antonio, USA)
Yu-Chee Tseng (National Chiao Tung University, Taiwan)
Cheng-Xiang Wang (Heriot-Watt University, UK)
Feng Wang (Seagate Inc., USA)
Huaxiong Wang (Macquarie University, Australia)
Haodong Wang (College of William and Mary, USA)
Bin Wei (AT&T Labs Research, USA)
Dapeng Oliver Wu (University of Florida, USA)
Jie Wu (Florida Atlantic University, USA)
Kui Wu (University of Victoria, Canada)
Shih-Lin Wu (Chang Gung University, Taiwan)
Ye Xia (University of Florida, USA)
Li Xie (Nanjing University, China)
Hui Xiong (Rutgers University, USA)
Cheng-Zhong Xu (Wayne State University, USA)
Zhen Xu (Beihang University, China)
Dong Xuan (Ohio State University, USA)
Guoliang Xue (Arizona State University, China)
Wei Yan (Peking University, China)
Kun Yang (University of Essex, UK)
Laurence T. Yang (St. Francis Xavier University, Canada)
Fan Ye (IBM Research, USA)
Qiang Ye (University of Prince Edward Island, Canada)
Mohamed Younis (University of Maryland Baltimore County, USA)
Gwo-Jong Yu (Aletheia University, Taiwan)
Qing-An Zeng (University of Cincinnati, USA)
Lisa Zhang (Bell Labs, USA)
Ning Zhang (University of Manchester, UK)
Wensheng Zhang (Iowa State University, USA)
Xi Zhang (Texas A&M University, USA)
Yan Zhang (National Inst. of Inf. and Comm. Tech., Singapore)
Ying Zhang (Palo Alto Research Center (PARC), USA)
Lian Zhao (Ryerson University, Canada)
Yiqiang Zhao (Carleton University, Canada)
Hao Zhu (Florida International University, USA)

Table of Contents

Keynote Speech

Application Oriented Networking (AON): Adding Intelligence to Next-Generation Internet Routers	1
<i>Laxmi N. Bhuyan</i>	
Multi-channel Wireless Networks: Capacity, Protocols, and Experimentation	3
<i>Nitin H. Vaidya</i>	

Session 2A: Wireless PAN and Wireless LAN

A Priority Management Scheme for High Rate Wireless Personal Area Network	5
<i>Jung-Hoon Song, Dong-Hoon Cho, Ki-Jun Han</i>	
Connection Control by Virtual Admission in Wireless LAN Environment	14
<i>Yen-Wen Chen, Yuan-Long Lee, I-Hsuan Peng</i>	
A Scalable Port Forwarding for P2P-Based Wi-Fi Applications	26
<i>Ming-Wei Wu, Yennun Huang, Ing-Yi Chen, Shyue-Kung Lu, Sy-Yen Kuo</i>	
An Adaptive Energy Saving Mechanism for the IEEE 802.15.4 LR-WPAN	38
<i>Dong-Hoon Cho, Jung-Hoon Song, Ki-Jun Han</i>	
Traffic-Aware Power Control Algorithm for Low Rate WPAN	47
<i>Younggoo Kwon</i>	

Session 2B: Wireless MAN and Pervasive Computing

A Generic Software Partitioning Algorithm for Pervasive Computing	57
<i>Songqiao Han, Shensheng Zhang, Yong Zhang</i>	
A New Methodology of QoS Evaluation and Service Selection for Ubiquitous Computing	69
<i>Yong Zhang, ShenSheng Zhang, SongQiao Han</i>	
An Enhanced Energy Saving Scheme in Mobile Broadband Wireless Access Systems	81
<i>Junfeng Xiao, Shihong Zou, Biao Ren, Shiduan Cheng</i>	

Energy Aware Multimedia Messaging Services Across Networks and
Across Devices for Mobile Users 93
Bin Wei, Lin Zhong

Dynamic Bandwidth Allocation in IEEE 802.16 104
*Weiwei Wang, Zihua Guo, Xuemin (Sherman) Shen, Changjia Chen,
Jun Cai*

Session 3A: Data Management

A Memory Efficient Algorithm for Packet Classification 115
Zhen Xu, Jun Sun, Jun Zhang

Energy-Efficient Multi-query Optimization over Large-Scale Sensor
Networks 127
Lei Xie, Lijun Chen, Sanglu Lu, Li Xie, Daoru Chen

On the Design of Soft-Decision Fusion Rule for Coding Approach
in Wireless Sensor Networks 140
*Tsang-Yi Wang, Po-Ning Chen, Yunghsiang S. Han,
Yung-Ti Wang*

Reliable and Real-Time Data Gathering in Multi-hop Linear Wireless
Sensor Networks 151
Haibo Zhang, Hong Shen, Hui Tian

Path Selection of Reliable Data Delivery in Wireless Sensor Networks 163
*Xiangke Liao, Shanshan Li, Peidong Zhu, Shaoliang Peng,
Weifang Cheng, Dezhun Dong*

An Efficient and Robust Routing Protocol for Data Aggregation 175
Xiwei Zhao, Kami (Sam) Makki, Niki Pissinou

**Session 3B: Mobility, Localization and Topology
Control**

An Area-Based Vertical Motion Estimation on Heterogeneous Wireless
Networks 187
Ing-Chau Chang, Ching-Hsiang Wang, Lin-Huang Chang

A Density Control Algorithm for Surveillance Sensor Networks 199
Yang Shen, Xianglan Yin, Hua Chen, Wangdong Qi, Hao Dai

Adaptive Weighted Clustering for Large Scale Mobile Ad Hoc
Networking Systems 206
*Tinku Rasheed, Usman Javaid, Laurent Reynaud,
Khalidoun Al Agha*

An Interference Free Cluster-Based TDMA Protocol for Wireless Sensor Networks	217
<i>Haigang Gong, Ming Liu, Xiaomin Wang, Lijun Chen, Li Xie</i>	
Integrated Multi-layer Registration Combining SIP with Mobile IP Schemes	228
<i>Lin-huang Chang, Jui-jen Lo, Chih-Yu Hsu, Ing-chau Chang</i>	
ELS: Energy-Aware Some-for-Some Location Service for Ad Hoc Mobile Networks	240
<i>Abdelouahid Derhab, Nadjib Badache, Karim Tari, Sihem Sami</i>	

Session 4A: Performance Modeling and Analysis

Throughput Capacity of UWB Ad-Hoc Networks with Infrastructure Support	252
<i>Fan Zhang, Xiaoyun Kang</i>	
Performance of Tomlinson-Harashima Precoding over Spatially Correlated MIMO Channels	264
<i>Anjian Li, Chongxiu Yu, Zhuo Chen, Dongmei Fang</i>	
Upper Bound on Operational Lifetime of Ultra Wide Band Sensor Network	271
<i>Juan Xu, Yongfa Hong, Changjun Jiang, Lin Chen</i>	
Single-Actor Selection Algorithms for Wireless Sensor and Actor Networks	283
<i>ZhenYang Xu, GuangSheng Zhang, Jie Qin, WenHua Dou</i>	
A Genetic Algorithm on Multi-sensor Networks Lifetime Optimization ...	295
<i>Yantao Pan, Wei Peng, Xicheng Lu</i>	

Session 4B: MAC

A Power Efficient MAC Protocol for IEEE 802.11 Multihop Ad Hoc Networks	307
<i>Hung-Jui Wu, Kuochen Wang, Lung-Sheng Lee</i>	
A Novel Energy-Aware TDMA Scheduling Algorithm for Wireless Sensor Networks	319
<i>Jianlin Mao, Xing Wu, Zhiming Wu, Siping Wang</i>	
A Distributed Code Assignment Algorithm with High Code Reusability for CDMA-Based Ad Hoc Networks	329
<i>Chang Wu Yu, Tung-Kuang Wu, Rei-Heng Cheng, Chia Hu Wu</i>	

A Medium Access Control Scheme for Providing Reliability in Wireless
Ad Hoc Networks 341
Song-Hee Lee, Jin-Young Choi

An Adaptive Latency-Energy Balance Approach of MAC Layer
in Wireless Sensor Networks 353
Jinniu Chen, Mingwei Xu, Yong Cui

Session 6A: Algorithm and System Design

A Convex-Hull Based Algorithm to Connect the Maximal Independent
Set in Unit-Disk Graphs 363
*Dechang Chen, Xilong Mao, Xia Fei, Kai Xing, Fang Liu,
Min Song*

A Pure Localized Algorithm for Finding Connected Dominating Set
in MANETs by Classification of Neighbors 371
Hui Liu, Yi Pan, Ivan Stojmenovic

Dependency-Based Dynamic Component Reconfiguration for Wireless
Computing Systems 382
*Jung-Ho Kwon, Byung-Hoon Lee, Jai-Hoon Kim,
We-Duke Cho*

Non-uniform Information Transmission for Minimum Distortion in
Wireless Networks 394
Tongtong Li, Huahui Wang, Jian Ren

A UDP-Based State-Sharing Mechanism of SIP Transaction Stateful
Proxy 404
Shi-zhang Luo, Jian-xin Liao, Xiao-min Zhu

A Novel Analog Pre-distorter of TWTA Non-linearity in High Power
Satellite Transmitters 416
Rafik Zayani, Ridha Bouallegue

Session 6B: Security

Secure Data Transmission on Multiple Paths in Mobile Ad Hoc
Networks 424
GeMing Xia, ZunGuo Huang, ZhiYing Wang

Accusation Resolution Using Security Metrology 435
Scott C.-H. Huang, Shamila Makki, Niki Pissinou

Ring Signature Based on ElGamal Signature 445
Jian Ren, Lein Harn

Key Management in Sensor Networks	457
<i>Guorui Li, Jingsha He, Yingfang Fu</i>	

Efficient Password-Based Authentication and Key Exchange Scheme Preserving User Privacy	467
<i>Zhenchuan Chai, Zhenfu Cao, Rongxing Lu</i>	

A Trust-Based Routing Framework in Energy-Constrained Wireless Sensor Networks	478
<i>Weifang Cheng, Xiangke Liao, Changxiang Shen, Shanshan Li, Shaoliang Peng</i>	

Session 7A: Broadcast/Multicast Routing

Minimum Multicast Time Problem in Wireless Sensor Networks	490
<i>Jianming Zhu, Xujin Chen, Xiaodong Hu</i>	

On Broadcast Authentication in Wireless Sensor Networks	502
<i>Kui Ren, Kai Zeng, Wenjing Lou, Patrick J. Moran</i>	

Tree-Based Multicast Meshes with Variable Density of Redundant Paths on Mobile Ad Hoc Networks	515
<i>Sangman Moh, Sang Jun Lee, Chansu Yu</i>	

Low-Latency Broadcast Scheduling in Ad Hoc Networks	527
<i>Scott C.-H. Huang, Peng-Jun Wan, Xiaohua Jia, Hongwei Du</i>	

Session 7B: OFDM Networks

A Study on the CI-OFDM Communication System for the High Quality and High Speed Communication System	539
<i>Heui-Seop Byeon, Jin-Kook Chung, Heung-Gyoon Ryu</i>	

Design and Analysis of Side Information Embedded PTS Scheme in the OFDM Communication System	550
<i>Seon-Ae Kim, Heung-Gyoon Ryu</i>	

Performance Analysis of a Framed ALOHA System with Diversity Frequency Hopping	561
<i>In-Hang Chung, Ming-Ching Yen</i>	

Optimized Channel Utilization in Multi-carrier Wireless Mobile Networks	572
<i>Amrinder Arora, Fanchun Jin, Hyeong-Ah Choi</i>	

Session 8A: Algorithms and Protocols

An Energy-Aware Quality of Services Routing Protocol in Mobile
Ad Hoc Networks 586
*Yun-Sheng Yen, Chih-Shan Liao, Ruay-Shiung Chang,
Han-Chieh Chao, Wei-Ming Chen*

Bandwidth Guaranteed Routing in Wireless Mesh Networks 597
Hongju Cheng, Nuo Yu, Qin Liu, Xiaohua Jia

An Altitude Based Dynamic Routing Scheme for Ad Hoc Networks 609
*Rei-Heng Cheng, Tung-Kuang Wu, Chang Wu Yu,
Chun-Hung Kuo*

PREG: A Practical Power Control Algorithm Based on a Novel
Proximity Graph for Heterogeneous Wireless Sensor Networks 620
Xue Zhang, Sanglu Lu, Daoxu Chen, Li Xie

Algorithms for Delay Constrained and Energy Efficiently Routing
in Wireless Sensor Network 632
Yuanli Wang, Xianghui Liu, Jing Ning, Jianping Yin, Yongan Wu

Session 8B: Modeling and Algorithms

The Effective Radius Model for Multi-hop Wireless Networks 643
Liran Ma, Weidong Jiang, Kai Xing, E.K. Park

Modeling and Analysis for an Enhanced Three-Tier Dynamic Location
Management in 3G 652
Jiachun Wu, Hao Zhang, Jianxin Liao, Xiaomin Zhu, Bo Yang

MTSP: Multi-hop Time Synchronization Protocol for IEEE 802.11
Wireless Ad Hoc Network 664
Guan-Nan Chen, Chiung-Ying Wang, Ren-Hung Hwang

Upperbounding End-to-End Throughput of Multihop Wireless
Networks 676
Hong Lu, Steve Liu

Dynamicity Aware Graph Relabeling Systems and the Constraint
Based Synchronization: A Unifying Approach to Deal with Dynamic
Networks 688
Arnaud Casteigts, Serge Chaumette

Studying Rational User Behavior in WCDMA Network and Its Effect
on Network Revenue 698
Yufeng Wang, Wendong Wang

Author Index 707