

Table of Contents

| | |
|--------------------------------------|----|
| Conference Organization | ix |
|--------------------------------------|----|

| | |
|-----------------------|----|
| Sponsors | xi |
|-----------------------|----|

Session: Networking Experience

Chair: J. Stankovic

- **Understanding Packet Delivery Performance in Dense Wireless Sensor Networks** 1
J. Zhao, R. Govindan (*University of Southern California*)
- **Taming the Underlying Challenges of Reliable Multihop Routing in Sensor Networks** 14
A. Woo, T. Tong (*University of California at Berkeley*),
D. Culler (*University of California at Berkeley & Intel Corporation*)

Session: Coverage

Chair: L. Clare

- **Integrated Coverage and Connectivity Configuration in Wireless Sensor Networks** 28
X. Wang, G. Xing, Y. Zhang, C. Lu, R. Pless, C. Gill (*Washington University in St. Louis*)
- **Minimal and Maximal Exposure Path Algorithms for Wireless Embedded Sensor Networks** 40
G. Veltri (*University of California at Los Angeles*), Q. Huang (*Washington University in St. Louis*),
G. Qu (*University of Maryland at College Park*), M. Potkonjak (*University of California at Los Angeles*)
- **Differentiated Surveillance for Sensor Networks** 51
T. Yan, T. He, J. A. Stankovic (*University of Virginia*)

Session: Storage

Chair: J. Hellerstein

- **Multi-dimensional Range Queries in Sensor Networks** 63
X. Li, Y. J. Kim, R. Govindan (*University of Southern California*), W. Hong (*Intel Research*)
- **GEM: Graph Embedding for Routing and Data-Centric Storage in Sensor Networks Without Geographic Information** 76
J. Newsome, D. Song (*Carnegie Mellon University*)
- **An Evaluation of Multi-resolution Storage for Sensor Networks** 89
D. Ganesan, B. Greenstein, D. Perelyubskiy, D. Estrin (*University of California at Los Angeles*),
J. Heidemann (*University of California at Los Angeles, University of Southern California*)

Session: Platforms

Chair: L. Krishnamurthy

- **Bluetooth and Sensor Networks: A Reality Check** 103
M. Leopold, M. B. Dydensborg, P. Bonnet (*University of Copenhagen*)
- **DFuse: A Framework for Distributed Data Fusion** 114
R. Kumar, M. Wolenetz, B. Agarwalla, J. Shin, P. Hutto, A. Paul, U. Ramachandran
(*Georgia Institute of Technology*)
- **TOSSIM: Accurate and Scalable Simulation of Entire TinyOS Applications** 126
P. Levis (*University of California at Berkeley, Intel Corporation*), Lee (*University of California at Berkeley*),
M. Welsh (*Harvard University*), D. Culler (*University of California at Berkeley, Intel Corporation*)

Session: Management

Chair: R. Govindan

- **Timing-sync Protocol for Sensor Networks** 138
S. Ganeriwal, R. Kumar, M. B. Srivastava (*University of California at Los Angeles*)
- **Tracking a Moving Object with a Binary Sensor Network** 150
J. Aslam (*Northeastern University*), Z. Butler, F. Constantin (*Dartmouth College*),
V. Crespi (*California State University at Los Angeles*), G. Cybenko, D. Rus (*Dartmouth College*)
- **Overload Management in Sensor-Actuator Networks Used for Spatially-Distributed Control Systems** 162
M. Lemmon, Q. Ling, Y. Sun (*University of Notre Dame*)

Session: Energy-Efficient MAC

Chair: F. Zhao

- **An Adaptive Energy-Efficient MAC Protocol for Wireless Sensor Networks** 171
T. van Dam, K. Langendoen (*Delft University of Technology*)
- **Energy-Efficient, Collision-Free Medium Access Control for Wireless Sensor Networks** 181
V. Rajendran, K. Obraczka, J. J. Garcia-Luna-Aceves (*University of California at Santa Cruz*)

Session: Dissemination

Chair: A. Perrig

- **Minimum-Energy Asynchronous Dissemination to Mobile Sinks in Wireless Sensor Networks** 193
H. S. Kim (*Seoul National University*), T. F. Abdelzaher (*University of Virginia*),
W. H. Kwon (*Seoul National University*)
- **Spatiotemporal Multicast in Sensor Networks** 205
Q. Huang, C. Lu, G.-C. Roman (*Washington University in St. Louis*)
- **Matching Data Dissemination Algorithms to Application Requirements** 218
J. Heidemann, F. Silva (*University of Southern California*),
D. Estrin (*University of Southern California, University of California at Los Angeles*)

Session: Compression & Aggregation

Chair: P. Bonnet

- **Model-Based Compression in Wireless Ad Hoc Networks** 231
M. Drinić, D. Kirovski (*Microsoft Research*), M. Potkonjak (*University of California at Los Angeles*)
- **Application-Specific Compression for Time Delay Estimation in Sensor Networks** 243
L. Vasudevan, A. Ortega, U. Mitra (*University of Southern California*)
- **SIA: Secure Information Aggregation in Sensor Networks** 255
B. Przydatek, D. Song, A. Perrig (*Carnegie Mellon University*)

Session: Congestion Control

Chair: R. Martin

- **CODA: Congestion Detection and Avoidance in Sensor Networks** 266
C.-Y. Wan, S. B. Eisenman, A. T. Campbell (*Columbia University*)
- **Practical Lazy Scheduling in Sensor Networks** 280
R. R. Kompella, A. C. Snoeren (*University of California at San Diego*)

Poster Session

- **BTnodes — A Distributed Platform for Sensor Nodes** 292
J. Beutel, O. Kasten, M. Ringwald (*Swiss Federal Institute of Technology*)
- **Online Data Cleaning in Wireless Sensor Networks** 294
E. Elnahrawy, B. Nath (*Rutgers University*)
- **Density, Accuracy, Delay and Lifetime Tradeoffs in Wireless Sensor Networks — A Multidimensional Design Perspective** 296
S. Adlakha (*Telogy Networks*), S. Ganeriwal (*University of California at Los Angeles*),
C. Schurgers (*University of California at San Diego*), M. B. Srivastava (*University of California at Los Angeles*)
- **Spatial Average of a Continuous Physical Process in Sensor Networks** 298
S. Ganeriwal, C. C. Han, M. B. Srivastava (*University of California at Los Angeles*)
- **An Energy-Balanced Transmission Scheme for Sensor Networks** 300
W. Guo, Z. Liu, G. Wu (*University of North Carolina at Charlotte*)
- **WiseMAC, an Ultra Low Power MAC Protocol for the WiseNET Wireless Sensor Network** 302
A. El-Hoiydi, J.-D. Decotignie, C. Enz, E. Le Roux (*Swiss Center for Electronics and Microtechnology*)
- **Entropy-based Sensor Selection for Localization** 304
H. Wang, K. Yao, G. Pottie, D. Estrin (*University of California at Los Angeles*)
- **Bandwidth Management in Wireless Sensor Networks** 306
B. Hull, K. Jamieson, H. Balakrishnan (*Massachusetts Institute of Technology*)
- **LEAP — Efficient Security Mechanisms for Large-Scale Distributed Sensor Networks** 308
S. Zhu, S. Setia, S. Jajodia (*George Mason University*)
- **Contour Detection Using Actuated Sensor Networks** 310
K. Dantu, G. S. Sukhatme (*University of Southern California*)
- **On the Effect of Localization Errors on Geographic Face Routing in Sensor Networks** 312
K. Seada, A. Helmy, R. Govindan (*University of Southern California*)
- **Using Adaptive Range Control to Optimize 1-Hop Broadcast Coverage in Dense Wireless Networks** 314
X. Li, T. D. Nguyen, R. P. Martin (*Rutgers University*)
- **On the Interaction of Network Characteristics and Collaborative Target Tracking in Sensor Networks** 316
V. Tsiatsis, M. B. Srivastava (*University of California at Los Angeles*)
- **On the Scaling Laws of Dense Wireless Sensor Networks** 318
P. K. Gopala, H. El Gamal (*The Ohio State University*)
- **Sensor Network as a Distributed Manager for Multi-Robot Task Allocation** 320
M. A. Batalin, G. S. Sukhatme (*University of Southern California*)
- **A Modular Power-Aware Wireless Microsensor Architecture** 322
M. Bajura, B. Schott, C. Worth, R. Riley, J. Czarnaski (*University of Southern California*)
- **Secure Locations: Routing on Trust and Isolating Compromised Sensors in Location-Aware Sensor Networks** 324
S. Tanachaiwiwat, P. Dave, R. Bhindwale, A. Helmy (*University of Southern California*)
- **Serial Data Aggregation Using Space-filling Curves in Wireless Sensor Networks** 326
S. Patil, S. R. Das (*State University of New York at Stony Brook*)

| | |
|---|-----|
| • Multidimensional Scaling Based Sensor Positioning Algorithms in Wireless Sensor Networks | 328 |
| <i>X. Ji, H. Zha (The Pennsylvania State University)</i> | |
| • Statistical En-route Filtering in Large Scale Sensor Networks | 330 |
| <i>F. Ye, H. Luo, S. Lu, L. Zhang (University of California at Los Angeles)</i> | |
| • Cooperative Tracking with Binary-Detection Sensor Networks | 332 |
| <i>K. Mechitov, S. Sundresh, Y. Kwon, G. Agha (University of Illinois at Urbana-Champaign)</i> | |
| • Wireless Sensor Network Characterization — Application to Demand Response Energy Pricing | 334 |
| <i>N. Ota, D. Hooks, P. Wright, D. Auslander, T. Peffer (University of California at Berkeley)</i> | |
| • Mantis — System Supports for Multimodal Networks on In-Situ Sensors | 336 |
| <i>H. Abrach, S. Bhatti, J. Carlson, H. Dai, J. Rose, A. Sheth, B. Shucker, J. Deng, R. Han (University of Colorado at Boulder)</i> | |
| • Sensor on Wheels — Towards a Zero-Infrastructure Solution for Intelligent Transportation Systems | 338 |
| <i>S. Goel, T. Imielinski, K. Ozbay, B. Nath (Rutgers University)</i> | |
| • Anchor-Free Distributed Localization in Sensor Networks | 340 |
| <i>N. B. Priyantha, H. Balakrishnan, E. Demaine, S. Teller (Massachusetts Institute of Technology)</i> | |
| Author Index | 343 |