2011 10th International Conference on Information Processing in Sensor Networks

(IPSN 2011)

Chicago, Illinois, USA
12-14 April 2011
**Table of Contents**

**IP Track Session 1: Detection and tracking**

Sensor Networks for the Detection and Tracking of Radiation and Other Threats in Cities................. 1-12  
*Annie H. Liu, Julian J. Bunn, K. Mani Chandy*

The Next Big One: Detecting Earthquakes and other Rare Events from Community-based Sensors... 13-24  
*Matthew Faulkner, Michael Olson, Rishi Chandy, Jonathan Krause, K. Mani Chandy, Andreas Krause*

Using Overcomplete Radon Bases for Target Property Management in Sensor Networks............... 25-36  
*Xiaoye Jiang, Mo Li, Yuan Yao, Leonidas J. Guibas*

**IP Track Session 2: Routing**

WiFlock: Collaborative Group Discovery and Maintenance in Mobile Sensor Networks............... 37-48  
*Aveek Purohit, Bodhi Priyantha, Jie Liu*

Exploration of Path Space using Sensor Network Geometry.......................................................... 49-60  
*Ruirui Jiang, Xiaomeng Ban, Mayank Goswami, Wei Zeng, Jie Gao, Xianfeng Gu*

Probabilistic Addressing: Stable Addresses in Unstable Wireless Networks................................. 61-72  
*Muhammad Hamad Alizai, Tobias Vaegs, Olaf Landsiedel, Stefan Gotz, Jo Agila Bitsch Link, Klaus Wehrle*

**Session 3: Best paper nominees IP-track**

Efficient Network Flooding and Time Synchronization with Glossy............................................. 73-84  
*Federico Ferrari, Marco Zimmerling, Lothar Thiele, Olga Saukh*

In-Pavement Wireless Sensor Network for Vehicle Classification............................................... 85-96  
*Ravneet Bajwa, Ram Rajagopal, Pravin Varaiya, Robert Kavaler*

Continuous Inference of Psychological Stress from Sensory Measurements Collected in the Natural Environment........................................................................................................ 97-108  
*Kurt Plarre, Andrew Raij, Syed Monowar Hossain, Amin Ahsan Ali, Motohiro Nakajima, Mustafa al’Ahs, Emre Ertin, Thomas Kamarck, Santosh Kumar, Marcia Scott, Daniel Siewiorek, Asim Smailagic, Lorentz E. Wittmers, Jr.*

**Demos Abstracts**

A Prototype of Sensor Network Visualization Application with Geographic Information........... 109-110  
*Kazuhisa Asakawa, Mitsuhiro Kashiwada, Norihisa Segawa, Jun Sawamoto*

Radio-diversity Collection Tree Protocol ....................................................................................... 111-112  
*Wen Hu, Brano Kusy, Christian Richter, Michael Bruenig, Cong Huynh*
EcoCast: Interactive, Object-Oriented Macroprogramming for Networks of Ultra-Compact Wireless Sensor Nodes

Yi-Hsuan Tu, Yen-Chiu Lee, Yi-Wei Tsai, Ting-Chou Chien, Pai H. Chou

Feature-Rich Platform for WSN Design Space Exploration

Bernhard Buchli, Mustafa Yuecel, Roman Lim, Tonio Gsell, Jan Beutel

Architecture for a Fully Distributed Wireless Control Network

Miroslav Pajic, Shreyas Sundaram, Mansimar Aneja, Srinivas Vemuri, George J. Pappas, Rahul Mangharam

Closed-loop Testing for Implantable Cardiac Pacemakers

Matthew Faulkner, Michael Olson, Rishi Chandy, Jonathan Krause, K. Mani Chandy, Andreas Krause

The Next Big One: Detecting Earthquakes and other Rare Events from Community-based Sensors

Zhihao Jiang, Miroslav Pajic, Rahul Mangharam

R.A.V.E.N. - Remote Autonomous Vehicle Explorer Network

Paul Martin, William Etter, Rahul Mangharam

EnRoute: An Energy Router for Energy-Efficient Buildings

Madhur Behl, Mansimar Aneja, Harsh Jain, Rahul Mangharam

DustDoctor: A Self-healing Sensor Data Collection System

Mohammad Maifi Hasan Khan, Hossein Ahmadi, Gulustan Dogan, Kannan Govindan, Raghu Ganti, Theodore Brown, Jiawei Han, Prasant Mohapatra, Tarek Abdelzaher

Apollo: Towards Factfinding in Participatory Sensing

H. Khac Le, J. Pasternack, H. Ahmadi, M. Gupta, Y. Sun, T. Abdelzaher, J. Han, D. Roth, B. Szymanski, S. Adali

AutoPlug - An Automotive Test-bed for ECU Testing, Validation and Verification

Utsav Drolia, Zhenyan Wang, Srinivas Vemuri, Madhur Behl, Rahul Mangharam

EcoIMU: A Compact, Wireless, Gyro-Free Inertial Measurement Unit Based on Two Triaxial Accelerometers

Yi-Lung Tsai, Ting-Ting Tu, Pai H. Chou

PhotoNet: A Similarity-aware Image Delivery Service for Situation Awareness

Hongyan Wang, Md Uddin, Guo-Jun Qi, Tom Huang, T. Abdelzaher, Guohong Cao

Online Detection of Speaking from Respiratory Measurements Collected in the Natural Environment

Md. Mahbubur Rahman, Amin Ahsan Ali, Andrew Raij, Mustafa al'Absi, Emre Ertin, Santosh Kumar

Efficient Data Retrieval for Interactive Browsing of Large Sensor Network Data Sets

Matthias Keller, Jan Beutel
Debugging Wireless Sensor Network Simulations with YETI and COOJA ................................................................. 141-142
  Richard Huber, Philipp Sommer, Roger Wattenhofer

A Service-Oriented Application Programming Interface for Sensor Network Virtualization .......... 143-144
  Mudasser Iqbal, Daiqin Yang, Talha Obaid, Teng Jie Ng, Hock Beng Lim

Diagnostic Tracing of Wireless Sensor Networks with TinyTracer ................................................................. 145-146
  Vinaiatheerthan Sundaram, Patrick Eugster, Xiangyu Zhang

Posters Abstracts

Three Plane Localization .......................................................................................................................... 147-148
  Johannes Schneider, Roger Wattenhofer

Message Position Modulation for Power Saving and Increased Bandwidth in Sensor Networks ..... 149-150
  Johannes Schneider, Roger Wattenhofer

Near-real-time Analysis for REACTS ................................................................................................. 151-152
  Doug Hakkarinen, Tracy Camp, Allan Haas, Andre Revil

Cross-Platform Wireless Sensor Network Development ................................................................. 153-154
  Morten Tranberg Hansen, Branislav Kusy

Multi-Purpose Passive Debugging for Embedded Wireless ........................................................................ 155-156
  Morten Tranberg Hansen

Hardware Platform for Wireless Geophysical Monitoring ........................................................................ 157-158
  Kerri Stone, Brian Hoenes, Tracy Camp

  Yong Yang, Lu Su, Mohammad Khan, Michael LeMay, Tarek Abdelzaher, Jiawei Han

  Charalambos Sergiou, Marios Koutroullos, Vasos Vassiliou

Modeling an Electronically Switchable Directional Antenna for Low-power Wireless Networks ... 163-164
  Biruk Silase Geletu, Luca Mottola, Thiemo Voigt, Fredrik Osterlind

A Channel Quality Metric for Interference-Aware Wireless Sensor Networks........................................... 167-168
  Claro Noda, Shashi Prabh, Carlo Alberto Boano, Thiemo Voigt, Mario Alves

Accurate Monitoring of Circadian Rhythms using Wearable Body Sensor Networks ................ 169-170
  Carlo Alberto Boano, Matteo Lasagni, Kay Romer, Tanja Lange
LinkBench: Benchmark and Metric Framework for Wireless Sensor Networks.........................171-172
   Krisztian Veress, Miklos Maroti

Proposed Long-Distance Communication in Sensor Network Using
Weak Radio Waves and DSP.................................................................173-174
   Mitsuhiro Kashiwada, Kazuhsa Asakawa, Haruo Tamaki, Masato Yazawa

Session 4: Best paper nominees - SPOTS track

Augmenting Sensornet Testbeds with Realistic and Controlled Interference Generation...........175-186
   Carlo Alberto Boano, Thiemo Voigt, Claro Noda, Kay Romer, Marco Zuniga

Is There Light at the Ends of the Tunnel? Wireless Sensor Networks for
Adaptive Lighting in Road Tunnels........................................................................187-198
   Matteo Ceriotti, Michele Corra, Leandro D'Orazio, Roberto Doriguzzi, Daniele Facchin, Stefan
   Guna, Gian Paolo Jesi, Renato Lo Cigno, Luca Mottola, Amy L. Murphy, Massimo Pescalli, Gian
   Pietro Picco, Denis Pregnanlato, Carloalberto Torghele

IMUSim: A Simulation Environment for Inertial Sensing Algorithm Design and Evaluation ..........199-210
   A. D. Young, M. J. Ling, D. K. Arvind

SPOTS Track Session 5: Platforms

SpiderBat: Augmenting Wireless Sensor Networks with Distance and Angle Information...........211-222
   Georg Oberholzer, Philipp Sommer, Roger Wattenhofer

SensorFly: Controlled-mobile Sensing Platform for Indoor Emergency Response Applications .....223-234
   Aveek Purohit, Zheng Sun, Frank Mokaya Pei Zhang

   Yin Chen, Qiang Wang, Marcus Chang, Andreas Terzis

SPOTS Track Session 6: Applications

Duty-Cycling Buildings Aggressively: The Next Frontier in HVAC Control...............................246-257
   Yuvraj Agarwal, Bharathan Balaji, Seemanta Dutta, Rajesh K. Gupta, Thomas Weng

OBSEERVE: Occupancy-Based System for Efficient Reduction of HVAC Energy ......................258-269
   Varick L. Erickson, Miguel A. Carreira-Perpinan, Alberto E.Cerpa

Radio Diversity for Reliable Communication in WSNs ..........................................................270-281
   Branislav Kusy, Christian Richter, Wen Hu, Mikhail Afanasyev, Raja Jurdak Michael Brunig,
   David Abbott, Cong Huynh, Diethelm Ostry
IP Track Session 7: Data Communications

Reconstruction of the Correct Temporal Order of Sensor Network Data....................................................... 282-293
Matthias Keller, Lothar Thiele, Jan Beutel

Foresee (4C): Wireless Link Prediction using Link Features ................................................................. 294-305
Tao Liu, Alberto E. Cerpa

Unified Broadcast in Sensor Networks........................................................................................................ 306-317
Morten Tranberg Hansen, Raja Jurdak, Branislav Kusy

IP Track Session 8: Localization

Convex Programming Based Robust Localization in NLOS Prone Cluttered Environments .......... 318-329
Sarfraz Nawaz, Niki Trigoni

Localising Speech, Footsteps and Other Sounds using Resource-Constrained Devices .................... 330-341
Yukang Guo, Mike Hazas

Sequential Monte Carlo for Simultaneous Passive Device-Free Tracking and Sensor Localization Using Received Signal Strength Measurements ..................................................... 342-353
Xi Chen, Andrea Edelstein, Yunpeng Li, Mark Coates, Michael Rabbat, Aidong Men

IP Track Session 9: Programming and Optimization

µSETL: A Set Based Programming Abstraction for Wireless Sensor Networks ................................................. 354-365
Mohammad Sajjad Hossain, A.B.M. Alim Al Islam, Milind Kulkarni, Vijay Raghunathan

EcoCast: Interactive, Object-Oriented Macroprogramming for Networks of Ultra-Compact Wireless Sensor Nodes ................................................................................................................ 366-377
Yi-Hsuan Tu, Yen-Chiu Li, Ting-Chou Chien, Pai H. Chou

Fast-Lipschitz Optimization with Wireless Sensor Networks Applications ................................................. 378-389
Carlo Fischione, Ulf Jonsson

Author Index ................................................................................................................................................. 391-393