



*Research Presentation by*

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# Wireless Networking Group

## Missions & Sponsors



The *Wireless Networking Group (WiNG)* at the School of Electrical and Information Engineering, University of Sydney pursues advanced research and development for individual networks and their integration toward a collaborated heterogeneous architecture.

We work on the architecture design and related protocols and techniques to make the future mobile broadband Internet closer.

We also work on securing the information network and bringing both infrastructure-based networks (e.g. cellular mobile, wireless LAN, and WiMax) and infrastructure-less networks (e.g. ad hoc and sensor networks) into a mutual agreement and collaboration.

WiNG realizes the importance of international collaborations and visibility. In that context, we carry out several of our research through international collaborations with academia and industry in Asia, Europe, and North America and we always welcome new partners from overseas.

Research projects in WiNG are supported through national competitive grants, industry funds, and international collaborations including:

- ***ARC, Discovery Scheme***
- ***ARC, Linkage Scheme***
- ***DEST, International Science Linkages Scheme***
- ***EU/Greek Government, Collaborative R&D Project***
- ***ARC, Australian Communications Research Network (ACoRN)***
- ***ARC, Research Network for a Secure Australia (RNSA)***
- ***DEST, French-Australian Science and Technology Program***
- ***University of Sydney, R&D Scheme***
- ***University of Sydney, Major Equipment Scheme***

# Wireless Networking Group

## Research Themes



Wireless Networking Group (WiNG) carries out a diverse range of advanced world-class research in the field of wireless networking in collaboration with national and international institutions and industry on the following topics:

### **Next Generation Mobile Networks**

- Next Generation Transparent Network Architecture for High Speed Communications
- Architectures and Protocols of the Integrated Wireless LAN and Cellular Systems
- Cross-correlated Security and QoS in Heterogeneous Mobile Networks
- Network Selection Algorithms in Heterogeneous Mobile Networks
- Multiple Access Schemes for Beyond 3G Networks
- Transport Protocol Implementation in Wireless Communication Networks
- Replication-based Location Tracking for 3G Wireless IP Network
- Capacity Enhancement of Wireless Cellular Networks
- Mobility Management Techniques in Wireless IP Networks
- Rate Control Algorithms for QoS Multimedia Communications over 3G Networks
- Traffic Management Techniques and Modeling in Wireless IP Networks

### **Mobile Ad Hoc and Mesh Networks**

- Aeronautical Ad Hoc Networks (AANET)
- Opportunistic Mobile Ad Hoc Networks
- Multi-layer Mesh Networks
- Vehicular Ad Hoc Networks (VANET)
- Multi-hop Ad Hoc and Mesh Networks

### **Wireless Sensor Networks**

- Routing Protocols for Wireless Sensor Networks
- Data Aggregation Techniques in Wireless Sensor Networks
- Fault-Resilient Sensing
- Security-Aware Routing Techniques in Wireless Sensor Networks

### **Satellite Communications**

- Load Balancing Techniques for NGEOS satellite IP networks
- QoS Routing and Handoff Schemes for Mobile Satellite Communication Networks
- Hybrid Satellite-Terrestrial Mobile IP Networks
- Ubiquitous Broadband Multimedia-on-demand Service over Satellites
- Routing Strategies in Next-Generation Satellite Networks

# Wireless Networking Group

## Members



### Prof. Abbas Jamalipour (Group Leader)

*Fellow IEEE, Fellow IEAust*

*Editor-in-Chief, IEEE Wireless Communications*

*IEEE Distinguished Lecturer*



### Next Generation Mobile Networks Theme

- *Rubaiyat Kibria*
  - Call Admission Control for Next Generation Mobile Networks
  - Game Theory based Outage Compensation in Next Generation Mobile Network
- *Kumudu S. Munasinghe*
  - A 3GPP-IMS based Approach for Converging Next Generation Mobile Networks
  - Unified Mobility Management Platform for Interworked 3G Cellular and Broadband Wireless Networks
- *Fazirulhisyam Hashim*
  - Securing the Next Generation Mobile Network

### Mobile Ad Hoc and Mesh Networks Theme

- *Ehssan Sakhaee*
  - Stable Clustering in Aeronautical Ad hoc Networks
- *Yaozhou Ma*
  - Optimized Routing Framework for Intermittently Connected Mobile Ad Hoc Networks
- *Farshad Javadi*
  - Distributed Scheduling based Dimensioning Mechanism for Wireless Mesh Networks
- *Fumie Ono*
  - Bi-directional Link Multiplexing with Multiple Antennas for Wireless Mesh Network

### Wireless Sensor Networks Theme

- *Mohammad Abdul Azim*
  - Two-Layer Fuzzy Optimized Forwarding for Cluster based Sensor Networks
- *Fan Bai*
  - Exploiting Spatial-Temporal Correlation in Wireless Sensor Networks Data Aggregation

### Off-shore Collaborative Works

- Satellite Communications
- Wireless Network Security
- WSN Security
- V2V Communications
- High-speed WLAN



## Past Research Topics

- Network Selection Algorithms in Heterogeneous Mobile Networks
- Multiple Access Schemes for Beyond 3G Networks
- TCP Improvement in Wireless Communication Networks
- Replication-based Location Tracking for 3G Wireless IP Network
- Capacity Enhancement of Wireless Cellular Networks
- Mobility Management Techniques in Wireless IP Networks
- QoS Routing and Handoff Schemes for Mobile Satellite Communication Networks
- Rate Control Algorithms for QoS Multimedia Communications over 3G Networks
- Traffic Management Techniques and Modeling in Wireless IP Networks