

# Application driven Wireless Networks

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## Introduction



- Joined CAIA in 2005
- Prior to that:
  - Melbourne Univ., Australia (5 years); Siemens, Hungary (6 years)
- Research interests:
  - Mathematical modelling, computational probability, performance evaluation, optimization and design for data networks and communication protocols
- Current focuses:
  - Networks that utilise wireless communication (Intelligent Transport Systems, WiFi/WiMax, Smart Grid and Sensor networks);
  - And also in mechanism design and network energy efficiency

## Application Driven



- Voice, Data, Game, Video
  - WLAN, WiFi (hotspot), WiMax networks
- ITS (safety, efficiency and environmental)
  - V2V, V2I (WiFi, DSRC) networks
- Monitor, tracking, management
  - Sensor networks, Smart meter, Smart Grid

## Research questions



- Voice, Data, Game, Video
  - WLAN, WiFi (hotspot), WiMax networks

Capacity problem, traffic interaction is not well understood, QoS guarantee is a challenge

voice capacity (Kewin S., Philip B.)

mechanism design (Suong Ng., Lachlan A., Ihsan Q.)

## Research questions

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- ITS (safety, efficiency and environmental)
  - V2V, V2I (WiFi, DSRC) networks

Reliability, mobility, security and human factor

MAC performance (Imrul H., Lachlan A.)  
handoff (Fazl N., Philip B., Jason B.), test-bed (Jason B.)

## Research questions

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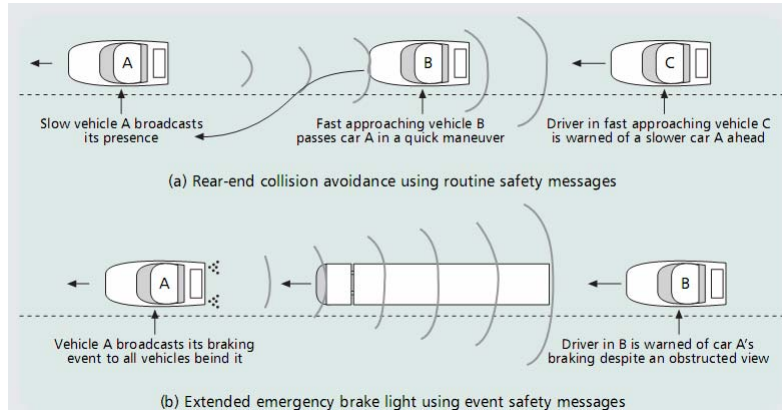


Energy constraint, noisy network and disorderly data pattern

PLC network (Mehdi K., Nasser H.)

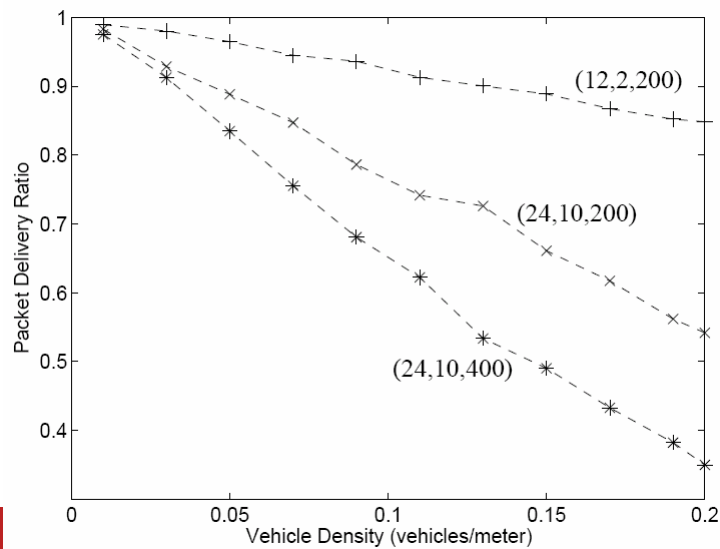
- Monitor, tracking, management
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## Research outcome: Example in ITS

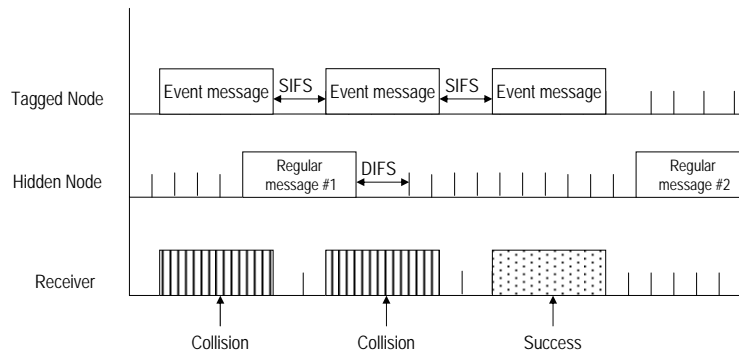


Source: IEEE Wireless Communications, Jiang, D., Taliwal, V., Meier, A., Hoffelder, W., & Herrtwich, R. (2006): Design of 5.9 GHz DSRC-based vehicular safety communication.

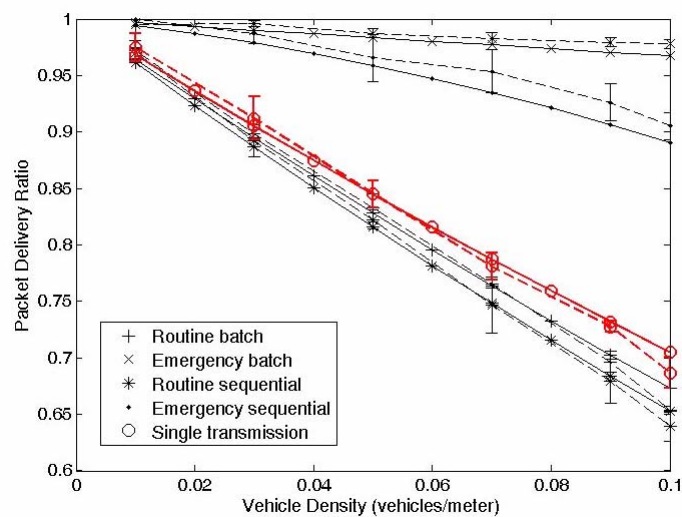
## Reliability for Safety



## Proposed Solution



## Enhanced reliability



## Plan to put it to the Test

