



**MACQUARIE**  
University  
SYDNEY - AUSTRALIA

# PhD Scholarships

Candidates are invited to apply for scholarships offered by Macquarie University.

*Scholarships are open to international candidates and include tuition.*

## Dynamic Spectrum

Useful frequency range very limited  
Demand increasing exponentially  
How to cope?

## Internet of Things

New network architecture  
Massive Connectivity  
User identification  
Multiple access  
Power consumption

## Small Cells

Aggressive frequency reuse  
Micro, Pico and Femto-cells  
Cell association  
Modeling, Analysis

## Network Management

Big data analytics  
Data transformation  
Fault detection/bottlenecks  
Self organizing networks

## 5G Wireless Networks:

Challenges:  
Short packets and IoT  
Huge and diverse applications  
Massive connectivity  
1msec latency challenge

## Massive MIMO

Multiuser MIMO  
Network MIMO  
Beamforming  
Coordinated beamforming

## mmWave

Modeling and capacity  
New network architectures  
Spectrum allocation  
Analytical models for optimization

## Fundamental Limits

Shannon theory  
Degrees of Freedom  
Interference Channels  
Networks (relay, broadcast...)



Macquarie University campus  
Sydney, Australia

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*We can also apply to Data61 (CSIRO) for a topup if your application is sufficiently strong.*

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