# Dan's Generals Paper

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## Abstract

This will be my abstract!

## 1 Introduction

Commodity wireless LAN technology has improved dramatically in the past decade. The low cost, small physical footprint, and minimal power consumption have led to the increasingly pervasive adoption of IEEE 802.11 (Wi-Fi) in a diverse set of consumer devices. These devices vary widely: they may be mobile or static, large or small, plugged in or battery powered; and the way these characteristics manifest can change over time depending on how devices are used. I summarize some representative commercial Wi-Fi devices in Table 1.

This ubiquity of Wi-Fi, in symbiosis with the dramatically increased speeds—from 2 Mbps to 600 Mbps between 802.11 (1997) and 802.11n (2009)—has led to a recent spate of proposed applications built by combining multiple of these devices.

## 2 Related Work

Related work including a short section of foundational work in the area of your thesis, a section on directly relevant work and how your proposed work either leverages that work (e.g., techniques you plan to adopt) or differs from it (e.g., novel contributions), and a description of how your proposed work is distinct from the work being done by your colleagues at UW.

**Vision:** HomeRF [8]. Mesh Nets [11].

**Multiple channels:** M-LANs [7]. MultiNet [2]. Multichannel CSMA [9].

## 3 Preliminary Work

Preliminary work section that describes the system you have built so far and/or preliminary results you have collected. Describe the strengths and weaknesses of your approach to date, including what it can and cannot do (or in the case of results, what those results show and what are the limitations of your results).

- Effective SNR [5].
- Troubadour [**?**].
- Power management [4].
- Channel measurement stuff that's cool.

## 4 Proposed work

Proposed work section that describes the main challenges and innovations that are needed to accomplish the proposed hypothesis, with as much description as possible of how you will tackle each one.

**Mechanisms:**

- capacity and isolation: operation on multiple channels via, e.g., psm
- flexible topology: multihop communication in wireless link
- responsiveness: mobility detection with CSI
- discovery: capability announcement/broadcast

**Capabilities:**

- Admission to Wi-Fi network
- Relay service
- Packet Buffer
- Fixed (e.g., same channel, always on)
- Power state

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- DNS/DHCP
- Access to Internet
- Media (Video/Audio/Pictures/etc. Source/Sink)
- Input device (M, KB, Touch, Sensors)
- Intermediary (e.g., transcoder)

**Algorithms:**

- allocation of devices/links to channels, esp. between bands
- decision to switch relays/etc.
- link rate/latency/etc. estimation: what/how to feed up to applications

| Device | Description | Characteristics |
|---|---|---|
| Eye-Fi [3] | Wi-Fi SD card used to transfer photos from digital camera | Mobile, small, battery power |
| WiDi [6] receiver [10] | Laptop screen sharing with HD TV | Static, large, plugged in |
| WiDi [6] transmitter | Built into laptops with Intel Wi-Fi | Mobile*, large, battery power* |
| Printer, scanner, fax | Transfer documents to/from printers | Static, large, plugged in |
| AirTunes [1] | Streaming audio | Static, small, plugged in |
| Laptop | Flexible computing device | Mobile, large, battery power |
| Tablet/Netbook | Flexible computing device | Mobile, medium, battery power |
| Smartphone | Handheld applications | Mobile, small, battery power |
| Smartphone | Handheld applications | Mobile, small, battery power |

Table 1: Some Wi-Fi enabled consumer devices.

- assignment of apps to protocols

**Apps:**

- Use phone as interface for instant replay streaming from DVR

## 5 Methodology and Evaluation

Methodology and evaluation: how do you plan to evaluate whether your hypothesis is correct?

## 6 Timeline

Provide a sequence and a timeline for how you will stage the work to graduate in a timely fashion.

## 7 Conclusions and Future Work

Conclusions and future work that will not be covered in the dissertation research.

- one device operating on multiple concurrent channels
- shifting work around to balance power consumption among devices
- security – setting up secure channels between mutually untrusting devices
- multicast in network
- spatial reuse on single channel
- coexistence between multiple home networks
- power control of devices

## References


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[8] K. J. Nagus, A. P. Stephens, and J. Lansford. HomeRF: wireless networking for the connected home. *IEEE Personal Communications*, 7(1):20–27, Feb 2000.

[9] A. Nasipuri and S. R. Das. Multichannel CSMA with signal power-based channel selection for multihop wireless networks. In *IEEE VTC*, 2000.

[10] NETGEAR PTV1000 Push2TV.

[11] P. Whitehead. Mesh networks: a new architecture for broadband wireless access systems. In *RAWCON*, 2000.