

# PHILIP B. LUNDRIGAN

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## RESEARCH INTERESTS

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Computer Networks, Wireless and Mobile Networks, and Wireless Network Management

## EDUCATION

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**Present** **Ph.D. in Computer Science**, *University of Utah*  
4.0 / 4.0 GPA

**April 2012** **Bachelor of Science in Computer Engineering**, *Brigham Young University*  
3.89 / 4.0 GPA  
Dean's List, College of Engineering, 2011  
Full Academic Brigham Young Scholarship, 2009-2012

## PROFESSIONAL EXPERIENCE

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**January 2013 to** **Research Assistant**, *University of Utah*  
**Current** *Wireless Association*: Researching associations of wireless clients to access points. Developed and implementing algorithm to improve and speed up associations in dense wireless networks. Working with USRP to test new signal processing methods to speed up associations. Researched state of the art wireless protocols 802.11k and 802.11ai.

**July 2013 to** **Wireless Research**, *Xandem Technology*  
**January 2014** Researched fall detection and localization using wireless sensor network for elderly care. Led development of small team to implemented real-time room-level localization algorithm using machine learning. Worked with raw wireless data to develop features for machine learning algorithm. Conducted experiments to evaluate and measure the accuracy of localization algorithm. Demonstrated working prototype to potential customers.

**April 2012 to** **Software Engineering Intern**, *Ancestry.com*  
**August 2012** Researched an alternative way to store and search large amounts of data using Apache Solr. Built a new wiki system for the development team to use.

**April 2011 to** **Research Assistant**, *Internet Research Lab, Brigham Young University*  
**April 2012** Contributed to framework, "WiFu", for experimenting on wireless transport protocols. Designed new TCP variant protocol specific for wireless mesh networks. Used wireless mesh network to run experiments and benchmark performance of different protocols.

**April 2010 to** **Research Assistant**, *FPGA Lab, Brigham Young University*  
**April 2011** Helped develop HMFlow framework for rapid prototyping on FPGAs. Designed and developed fast loading and saving of serialized data structures. Created complex data structures to model FPGA designs.

## PROJECTS

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### 2014 **Personal Blog**

Short articles with random coding projects. One project has been written about in several blogs, including Cult of Mac.

### 2013 **Day One Adobe Lightroom Plugin**

Built a plugin that allows users to export photos from Adobe Lightroom to the Mac journaling application, Day One. Open sourced plugin on GitHub, with some popularity. Added features and fixed bugs based on user feedback. Plugin receives about 30 views every day on GitHub.

### 2013 **Wireless Association Research**

Built framework to measure and evaluate wireless association times between clients and access points. Helped to identify where bottlenecks are located in the association process.

### 2012 **Day One Exporter**

Contributed to open source project, Day One Exporter. Added feature to show weather on exported entries from the Mac application, Day One.

### 2010 to 2011 **Y-Clops**

Worked with a large group to build an autonomous robot for Intelligent Ground Vehicle Competition. Worked specifically on the robots camera using OpenCV to recognize obstacles. Used image-processing techniques such as edge detection and thresholding to detect obstacles.

## PUBLICATIONS

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R. Buck, R. Lee, **P. Lundrigan**, and D. Zappala, “WiFu: A composable toolkit for experimental wireless transport protocols,” presented at the *9th IEEE International Conference on Mobile Ad-Hoc and Sensor Systems*, 2012, pp. 299–307.

C. Lavin, M. Padilla, J. Lamprecht, **P. Lundrigan**, B. Nelson, and B. Hutchings, “HMFlow: Accelerating FPGA Compilation with Hard Macros for Rapid Prototyping,” *IEEE 19th Annual International Symposium on Field-Programmable Custom Computing Machines (FCCM)*, 2011, pp. 117–124.

C. Lavin, M. Padilla, J. Lamprecht, **P. Lundrigan**, B. Nelson, and B. Hutchings, “RapidSmith: Do-It-Yourself CAD Tools for Xilinx FPGAs,” presented at the *International Conference on Field Programmable Logic and Applications (FPL)*, 2011, pp. 349–355.

C. Lavin, M. Padilla, **P. Lundrigan**, B. Nelson, and B. Hutchings, “Rapid prototyping tools for FPGA designs: RapidSmith,” presented at the *International Conference on Field-Programmable Technology (FPT)*, 2010, pp. 353–356.

## SKILLS

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|---------------------------------|--|
| <b>Programming Languages</b>    | Python, Java, C++, C, C#, Objective C, Racket, Lua, JavaScript |
| <b>App Development</b>          | Android, iOS   |
| <b>Version Control Software</b> | git, SVN   |
| <b>Databases</b>                | MySQL  |
| <b>IDEs</b>                     | Visual Studio, Eclipse, NetBeans, Xcode                        |
| <b>Web</b>                      | HTML, CSS, JavaScript (Backbone.js and jQuery)                 |

## SELECTED COURSES

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**Spring 2013 Wireless Networks**

Learned about a wide variety of wireless networks. Researched and measured the association times of 802.11n WiFi networks and proposed solutions on how to speed up association times.

**Spring 2013 Compiler Principles and Techniques**

Implemented all stages of language compilation, including tokenizing, parsing, transforming to high-level intermediate representation, transforming to continuation-passing style, and finally transforming to C. Built a Python compiler using Racket programming language.

**Fall 2012 Network Security**

Researched and implemented redirect attack which stops redirects from insecure websites to secure websites from occurring. Used `netfilter` and modified IP tables to stop and modify web traffic on the fly.

**Fall 2012 Database Systems**

Implemented parts of database management system such as B+ tree, buffer manager, and heap file. Also implemented common database operations including joining, using external sorting.

**Winter 2012 Introduction to Machine Learning**

Built perception, backpropagation, and decision tree machine learning algorithms and used them to recognize patterns in real data. Using car crash data from NHTSA Fatality Analysis Reporting Systems (FARS), created machine learning algorithm to predict factors leading to car crashes.

**Fall 2011 Software Design and Testing**

Worked with large group to build Java based home inventory tracking application. Implemented and utilized modern design patterns and testing methodologies.

**Fall 2011 Embedded Systems**

Worked with Xilinx Vertex-II FPGA to build fully functional Space Invaders game using C and VHDL.

**Fall 2010 Real-Time Operating Systems**

Built components of real time operating system for Intel 8086 architecture using C and assembly.