Timothy Lardner, PhD

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Overview

I am a highly-motivated software engineer and researcher. I enjoy intellectually challenging work, solving complex technical problems using my experience in both research and software engineering.

I have a wide experience of technologies and am quick and eager to learn anything new. I'm looking for a position that will allow me to explore novel solutions to problems, both hardware and software.

In my current position, I am driving the team to write more secure and more maintanable code through discussion of best practices and designing and implementing improvements for the existing codebase. I recently took part in a firm-wide security competition where I was ranked 2nd worldwide for secure Python Django development.

I enjoy programming and solving problems, both in the office and in my free time. Some of my personal projects are available at `https://github.com/timlardner`.

Technical Skills

Expert
Python, Pandas, NumPy, Django, Javascript, MATLB, CUDA, C++, LabVIEW, Git, Linux, LaTeX, Data Visualisation, TCP/IP

Intermediate
Flask, jQuery, AngularJS, C#, PHP, MySQL, Oracle SQL, Bash, Java, Embedded Systems, Oracle Grid Engine, AWS, Docker, Big Data Analytics, Redis, Celery, Nginx, PKI

Other SDLC Skills
TeamCity, Jenkins, TravisCI, Jira, Agile, Scrum

Professional Experience

2017–Present

JP Morgan Chase & Co: **Software Engineer**

Plato

As a software engineer within an agile team on the firm's strategic risk reporting and management platform for credit derivitives, my work is split between backend and frontend design, developement and testing.

I am a recognised *Application Security Champion* within the firm and am driving our team to deliver secure software and to keep up-to-date with security trends and vulnerabilities.

I have a reputation for excellence from both technology and business colleagues and frequently contribute to key architecural decisons for our application.

Also conduct interviews and review technical excercises for other prospective employees.

Technologies used: Python, Pandas, Django, AngularJS, REST, Jira, Git, Oracle Exadata, Jenkins, Linux

2014–2017

University of Strathclyde: **Research Associate**

ADAPT

Leading the design and development of software to automatically analyse large sets of time-series data for defect and anomoly detection.

This high-visibility international project involved collabarating with a prominent nuclear power generating firm and delivering both written and in-person updates to board-level senior stakeholders

I was hand-picked for this project due to my record of success in multidisciplinary research involving signal processing and software design.

Reduced processing time by 98% when comparing the ADAPT software with the existing analysis methodology.

Technologies used: Python, NumPy, Celery

cueART

Lead developer on a team of 3, designing a signal acquisition and processing platform within LabVIEW.

Needed to interface with hardware via MATLAB, C#, and LabVIEW by writing custom adapters. CUDA C++ signal processing algorithms provided rapid imaging results.

I started porting key elements of this software to Python for maintainability reasons when I left this position.

Technologies used: LabVIEW, MATLAB, C++, C#, Python

Education

2010–2016 **PhD** in Electronic and Electrical Engineering
New Algorithms for Ultrasonic Non-Destructive Testing

This research was inspired by a growing necessity to verify the structural integrity of industrial components. Throughout this study, I worked closely with large multinational companies including Amec Foster Wheeler, Royal Dutch Shell and Rolls Royce.

New signal processing algorithms were developed that operate on both time-series and frequency-domain signals and improve signal-to-noise ratio of ultrasonic imaging by over 2.5x compared to the current state-of-the-art.

A new efficient imaging algorithm was also developed that allowed the rapid processing of ultrasonic data using CUDA C++ for parallel processing. The resulting algorithm was shown to outperform the next closest competitor by 50x at the time of publication.

I also gained experience into distributed computing and have worked with Oracle Grid Engine.

Multiple publications have arisen from this research and the work from this study has been presented at two international conferences as well as a number of national engagements.

2005–2010 **MEng** in Electronic and Electrical Engineering

I studied a number of communications, microcontrollers and digital signal processing modules towards culmination of my undergraduate degree. I gained experience in digital communications networks, both wired and wireless. I using C, C++, Assembly and MATLAB on a combination of OS X, Windows, Linux and embedded devices.

Projects

An investigation was made into the operation of WiMAX. Throughpu t of a network was tested using different modulation schemes such as BPSK and QAM. Wireless data was recorded using an Agilent VXI mainframe configured with signal-capture hardware. Vector signal analysis software was used to decode and interpret recorded WiMAX data. A vector signal generator was used to inject noise into the system to test the resilience of the network.

A home automation system was developed using Texas Instruments MSP430 microcontroller-based keychains to track users' movements throughout an area via the RSSI protocol over Zigbee. Location information was fed to a C++ application running on a Linux server which relayed instructions to a series of Microchip PIC microcontrollers via a Lantronix XPort ethernet to serial adapter. The digital IO of the PIC microcontrollers were used to control relays connected to light switches and sockets to allow appliances to react to the movement of a user throughout the home.

List of Publications

[1] Panagiotis Zacharis, Graeme West, Gordon Dobie, **Lardner, Timothy**, and Anthony Gachagan. Data-Driven Analysis of Ultrasonic Inspection Data of Pressure Tubes. *Nuclear Technology*, 0(0):1–8, March 2018.

[2] **Lardner, Timothy**, Graeme West, Gordon Dobie, and Anthony Gachagan. Automated sizing and classification of defects in CANDU pressure tubes. *Nuclear Engineering and Design*, 325:25–32, December 2017.

[3] **Lardner, Timothy**, Graeme West, Gordon Dobie, and Anthony Gachagan. An expert-systems approach to automatically determining flaw depth within CANDU pressure tubes. In *10th International Topical Meeting on Nuclear Plant Instrumentation, Control and Human Machine Interface Technologies*, Hyatt Regency, April 2017.

[4] C. Mineo, C. MacLeod, M. Morozov, S. G. Pierce, **Lardner, T.**, R. Summan, J. Powell, P. McCubbin, C. McCubbin, G. Munro, S. Paton, D. Watson, and D. Lines. Fast ultrasonic phased array inspection of complex geometries delivered through robotic manipulators and high speed data acquisition instrumentation. In *2016 IEEE International Ultrasonics Symposium (IUS)*, pages 1–4, September 2016.

[5] Huan Zhao, Jeff Dobson, Anthony Gachagan, **Lardner, Timothy**, and Gordon Dobie. Hybrid simulation model of ultrasonic inspection of pressure tubes in nuclear industry. In *Proceedings of 55th Annual British Conference of Non-Destructive Testing - NDT 2016*, pages 1–10. British Institute of Non-Destructive Testing, New York, USA, September 2016.

[6] **Lardner, Timothy**. *New algorithms for ultrasonic non-destructive evaluation.* Ph.D., University of Strathclyde, 2016.

[7] Roy H. Brown, S. Gareth Pierce, Ian Collison, Ben Dutton, Jerzy Dziewierz, Joseph Jackson, **Lardner, Timothy**, Charles MacLeod, and Maxim Morozov. Automated full matrix capture for industrial processes. *AIP Conference Proceedings*, 1650(1):1967–1976, March 2015.

[8] Ailidh McGilp, Jerzy Dziewierz, **Lardner, Timothy**, Anthony Gachagan, John MacKersie, and Colin Bird. Inspection of complex components using 2d arrays and TFM. In *53rd Annual Conference of the British Institute of Non-Destructive Testing (NDT 2014)*. British Institute of Non-Destructive Testing, January 2015.

[9] Ailidh McGilp, Jerzy Dziewierz, **Lardner, Tim**, John Mackersie, and Anthony Gachagan. Inspection design using 2d phased array, TFM and cueMAP software. *AIP Conference Proceedings*, 1581(1):65–71, February 2014.

[10] Bo Xiao, Rui Gongzhang, **Lardner, Timothy**, Richard O'Leary, and Anthony Gachagan. Speckle suppression using adaptive frequency compounding in ultrasound nondestructive evaluation of coarse-grained material, July 2014.

[11] **Lardner, Timothy**, Minghui Li, and Anthony Gachagan. Using phase information to enhance speckle noise reduction in the ultrasonic NDE of coarse grain materials. *AIP Conference Proceedings*, 1581(1):1061–1068, February 2014.

[12] R. Gongzhang, M. Li, B. Xiao, **Lardner, T.**, and A. Gachagan. Robust frequency diversity based algorithm for clutter noise reduction of ultrasonic signals using multiple sub-spectrum phase coherence. *AIP Conference Proceedings*, 1581(1):1948–1955, February 2014.

[13] **Lardner, T.**, M. Li, R. Gongzhang, and A. Gachagan. A new speckle noise suppression technique using cross-correlation of array sub-apertures in ultrasonic NDE of coarse grain materials. *AIP Conference Proceedings*, 1511(1):865–871, January 2013.

[14] J. Dziewierz, **Lardner, T.**, and A. Gachagan. A design methodology for 2d sparse NDE arrays using an efficient implementation of refracted-ray TFM. In *2013 IEEE International Ultrasonics Symposium (IUS)*, pages 136–138, July 2013.

[15] R. Gongzhang, M. Li, **Lardner, T.**, and A. Gachagan. Robust defect detection in ultrasonic nondestructive evaluation (NDE) of difficult materials. In *2012 IEEE International Ultrasonics Symposium*, pages 467–470, October 2012.