

DOMINIC LINDSAY

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BIOGRAPHY

Experienced and passionate Research Engineer with strong demonstrated history of working both academic and software industries Currently working towards a PhD of Computer Science. Research include development of novel resource management and scheduling policies for management of decentralised clusters. Strong experience of managing and deploying large scale distributed systems and infrastructure as well as Operating Systems development for both Linux and embedded systems.

EDUCATION

Lancaster University, Lancaster, United Kingdom PhD Computer Science	<i>September 2017 - Present</i> <i>Expected Completion: March 2021</i>
Lancaster University, Lancaster, United Kingdom Masters in Science (MSci), Software Engineering	<i>October 2012 - June 2016</i> <i>1st Class</i>
Loreto College, Manchester, United Kingdom BTEC National Extended Diploma IT Practitioner	<i>September 2010 - June 2012</i> <i>A*A*A*</i>

RESEARCH PROJECTS

Epimetheus: Intercluster Aware Orchestration

PhD Thesis Project

Large scale distributed applications are supported by “clusters” of shared computing resources. Schedulers are responsible for orchestration of application workloads whilst maintaining cluster invariants. Shared resource clusters are composed of several clusters of resources managed as a single federated clusters, providing infrastructure for any class of application workload. However current federated cluster architecture fail to account for performance implication related to inter-cluster operations. As such they are exposed to volatile network behaviours, dynamic cluster utilisation and heterogenous subcluster scheduling policies. This project aims to develop novel scheduling policies capable of capturing inter-cluster metrics and meet the demands of dynamic workloads executing across decentralised infrastructures.

Feature Monkeys, a composable framework for Internet of Things applications.

MSci Project – with Demopad Software

Feature composition framework for development of bespoke IoT Smart-Home applications from “Software Produce Lines”. In this project I developed a framework which enables composition of IoT *features* (sensing, actuation), enabling end user to compose application for their smart home environment. The project achieved two goals, development of a *feature* plugin framework for interfacing with new IoT devices, and second, development of a feature composition framework enabling end user to compose new smart home applications.

PUBLICATIONS

1. **D.Lindsay**, S.S.Gill, P.Garraghan — PRISM: An Experiment Framework for Straggler Analytics in Containerized Clusters (***Published***)
Proceedings of the 5th International Workshop on Container Technologies and Container Clouds
2. **S.S.Gill**, **D.Lindsay**, P.Garraghan, et al - Transformative effects of IoT, Blockchain and Artificial Intelligence on cloud computing: Evolution, vision, trends and open challenges
*Internet of Things (*in-review*)*

3. **D.Lindsay**, Y.Elkhatab, P.Garraghan - Intercluster aware orchestration for decentralised infrastructure (*on-going*)

TECHNICAL STRENGTHS

Systems Development	C, C++, Rust, Java, Python, GoLang
Operating Systems	Linux, Windows, BSD, Raspbian (ARM)
Infrastructure Management	Kubernetes, Yarn Ceph, HDFS, Prometheus
Deployment	Docker, LXC, Ansible, Puppet

INDUSTRIAL EXPERIENCE

ARM, Cambridge <i>Research Engineer</i>	June 2020 — September 2020 <i>Rust, C++, Nix</i>
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Part of the security research team investigating Trusted Execution Environments and their applications in distributed edge computation. This project spans formally verified kernel development to implementation of high level application frameworks. Specifically my work here includes development of dynamic capability and memory management libraries. Whilst a secondary objective during my time at Arm included the design of distributed trusted computing platform used for execution of applications over dataset's owned by mutually distrusting peers across a distributed cluster of TEE enabled hosts's.

Lancaster University <i>Teaching Assistant</i>	September 2017 - Present
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Teaching and coursework development for multiple modules including:

- Operating Systems – Concurrency, Memory Management, Filesystems and Linux Kernel Development.
- Networking – Protocols (ICMP, TCP, UDP), and network programming.
- Distributed Systems – Distributed data processing frameworks (Yarn, Spark), Virtualisation and Isolation, RPC with GRPC and Java RMI.

Demopad Software, Lancaster <i>Platform Software Engineer</i>	September 2017 - January 2019 <i>C++, NodeJS, Bash, Docker</i>
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I was responsible for identifying the cause of and fixing bugs in the system platform. Implementation of functional features and devices required for extension of demopads automation platform. Development of an automated build platform, capable of pulling latest changes from a *version control system* and building a release and development image.

SCISYS, Bristol <i>Software Engineer</i>	July 2016 - September 2017 <i>Java, C++, JavaScript, NodeJS, Apache ESB</i>
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At Scisys I worked on a variety of projects as a software engineer within the company and collaborated with industry partners. These included development of automated validation and testing of safety critical systems including RNLI's SIMS situational awareness and control platform. Worked as part of R&D developing personal tracking and alert system for outdoor security operation in outdoor environments. Taking a leading role in the design and development of the IoT platform making use of several micro-service frameworks including apache storm and camel.

REFERENCES

Dr Peter Garraghan, Lancaster University *Lecturer (Supervisor)* – p.garraghan@lancaster.ac.uk
Dr Yehia Elkhatab, Lancaster University *Senior Lecturer* – y.elkhatab@lancaster.ac.uk
Dr Gerald Kotonya, Lancaster University *Senior Lecturer* – g.kotonya@lancaster.ac.uk