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# Michael Andrew Hicks (B.Sc. Ph.D.)

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*CV Valid as of: 2020-10-19*

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## EDUCATION

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### **Doctor of Philosophy in Computer Science**

*October 2004-May 2008*

#### **University of Hertfordshire**

- Field: Computer Architecture (Energy Efficient Processor Design).
- Thesis Entitled: “Energy Efficient Branch Prediction”.
- Thesis demonstrated a novel technique for saving significant energy in modern processors through the combination of compilation and profiling methods, with only minimal hardware modifications.

### **Bachelor of Science in Computer Science (*First-Class Honours*)**

*October 2001-October 2004*

#### **University of Hertfordshire**

- Dissertation/Project: “A Cross-Platform, Multi-Architecture Neural Network Simulator” written in C++ and completely using the Qt libraries. Included development of neural modelling, histogram visualisation, node-graph display and a simple scripting language.
- Courses: High Performance Processor Design and Parallel Processing, Programming Language Design and Implementation, Computer Networks Principles and Applications, Final Year Project (above), Operating Systems and Networks, Principles of Artificial Intelligence and Neural Networks, Program Design, Software Quality.

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## EXPERIENCE

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### **Senior Architect (Software) – Product Quality & Reliability, Philips Innovation Services** *March 2017–Present* **Royal Philips N.V.**

- Contributor to many projects across Philips’ global portfolio in roles relating to the improvement of software quality and reliability, all within a strictly regulated, safety-critical environment.
- Competence owner for software, with areas of responsibility including (architectural) design, FMEA, quality metrics, testing, verification & validation and development processes.
- *Highlighted Project:* PO/Architect, AED Software (multi-site, inter-continental project executed in SAFe)
  - Product Owner and Architect for team delivering foundational software component designs and implementations for use as part of a new Automated Emergency Defibrillator (Class III device).
  - Embedded C++ based project built on model-based engineering techniques (statecharts, active objects, QP).
  - Meticulous, regulatory-compliant requirements analysis and design documentation (extensive use of UML).
  - Role also included managing the failure/risk analysis process for the entire software system.

### **Design Engineer – Image Quality, Metrology**

*July 2015–February 2017*

#### **ASML Holding N.V. (via AKKA-MATIS)**

- Software Engineer in team responsible for design, implementation and maintenance of optical calibration algorithms and tooling.
- Large, complex and customer-critical code-base (C/C++/Python/MATLAB) requiring high standard of quality.
- Scrum Master & responsible for introducing Agile/Scrum to the traditionally structured software domain team.
- Role demanded a balance between technical engineering, team management and pragmatism.

### **Head of Software Quality Assurance**

*June 2014–June 2015*

#### **ScreenPoint Medical B.V., Nijmegen**

- Working on a consultancy basis as Quality Officer with a small team of developers and scientists.
- Position concurrent, and in agreement, with work at DIAG Technologies
- Establishing the software development process and overall Quality Management System for the newly formed company, including the improvement of existing software.
- Managing the developers in the construction of a technical document file and verification/validation of the software Class IIa device (automated mammography cancer detection software).

### **Head of Software Engineering & Quality Assurance**

*December 2010–June 2015*

#### **DIAG Technologies – Spin-off from University Medical Centre Nijmegen**

- Development lead of the actively used clinical workstation ‘ProCAD’ (for MRI prostate cancer diagnosis, staging and biopsy):
  - Working with an existing large and intricate C/C++, Python and TCL/TK code base.
  - Intimate experience with a critical and commercial clinical system.
  - Implementation and visualisation of image processing operations over large 4D volumetric datasets (curve fitting, pharmacokinetic parameters) using VTK.

- Development of a bespoke archiving library for DICOM image meta-information and clinical/research annotations.
- *CE* Medical Device certification process lead for ProCAD/‘DIAG Technologies’:
  - Enabling the use of ‘ProCAD’ as a Class IIa device for clinical diagnosis in other institutions.
  - Commercial resale of ‘ProCAD’ as a medical device (in use internationally).
  - Entailed the creation and ISO 13485 certification of a Quality Management System.
  - Required extensive software and process (Agile development) documentation (ISO 14971 & IEC 62304), in addition to the software verification and validation.

#### **Scientific Software Engineer**

*December 2010–December 2011*

#### **Diagnostic Image Analysis Group – University Medical Centre Nijmegen**

- EU FP7 HAMAM project (with several partner institutions):
  - Developed a high-speed geometric-based multi-modal region linking/registration process (Mammography to/from Ultrasound).

#### **Research Associate**

*November 2008–October 2010*

#### **Computer Systems Architecture Group – University of Amsterdam**

- Working on the compiler (a fork of GCC 4) for the parallel ‘ $\mu$ TC’ language  $\Rightarrow$  Microgrid ISA, as part of the compiler engineering team. In addition to the many research challenges in the compilation of a parallel language, this also necessitated a working knowledge of the GCC framework at all stages of compilation.
- Implementing parallel supercomputing benchmarks, in the ‘ $\mu$ TC’ language, for performance evaluation and testing of the novel Microgrid Many-Core Processor architecture and tool-chain. This posed the complexities of fully extracting and expressing parallelism within the constraints of the concurrency model.
- Conceptualising, engineering and implementing (using C++, in the cycle-accurate simulator) a novel hardware parallel I/O system for the Microgrid architecture and a co-designed OS software stack, to facilitate high-throughput external device I/O in a massively parallel environment.

#### **Ph.D. Project**

*October 2004–May 2008*

#### **Compiler Technology/Computer Architecture group – University of Hertfordshire**

- Work centred at the hardware/software interface, with consideration of its dynamic interdependency.
- Developed a customised version of a well known super-scalar processor simulator with power modelling. Developed in Linux using C. This required a very high level of programming ability.
- Designed & implemented a static instruction scheduler and annotator for the assembly language of the above simulator, within the GCC framework.
- Developed a kernel level instruction tracer/runtime disassembler. Developed using C and Linux Kernel.

### **SKILLS SUMMARY**

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**Analytical:** Strong grasp of scientific underpinnings of informatics: algorithms, complexity, concurrency, mathematical structures and tools, quantitative analysis of experimental results.

**Communication:** Highly effective written and verbal communication skills, as evidenced by peer-reviewed publications & conference presentations, high quality documentation, and development coordination roles.

**Project:** Requirements analysis, design & development (incl. planning), FMEA, quality assurance (incl. ISO 13485), verification&validation, product release and maintenance – all using Agile methods. Certified Scrum Master and Product Owner.

**Programming Languages:** C, C++, Python, Bash, Lua, Javascript/HTML/CSS, Java, Pascal, Assembly, Lisp, Prolog, Haskell.

**Operating Systems:** Linux, Unix (Solaris & FreeBSD), MacOS X, Minix, Windows.

**Tools:** Git / SVN / ClearCase, TFS / Jira / Trac / Redmine, Visual Studio, GCC, GDB, Valgrind, Qt ...

**Other:** Model-based design & UML, cross-platform development, model-driven engineering, continuous integration & delivery, TDD, debugging and dynamic analysis, OSs & Linux kernel, IC & electronics knowledge.

### **INTERESTS AND OTHER WORK**

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- Architect and maintainer of the *cross-platform, software-libre* ‘Simulacrum library and applications’ for high-performance volumetric/image space manipulation and visualisation, with native rendering, DICOM (medical data), parallel algorithms, and large-scale data indexing implementations ([mahicks.org/Simulacrum](http://mahicks.org/Simulacrum)).
- Creator and maintainer of ‘Web-FMEA’: a powerful web-based tool for efficient, collaborative *Failure Mode and Effect Analysis* ([fmea.dev](http://fmea.dev)).
- Computing: computer architecture, operating systems, HPC, rendering, Linux, free software, embedded devices.

### **REFERENCES**

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Full references available upon request.