

Gareth David Smith

D.O.B. 1980/10/11

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INFORMATION *****

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PROFILE

Gareth is a Research Associate at Imperial College, working on resource reasoning about web programs. This work involves understanding the Document Object Model (DOM), the distributed nature of “mashups” and the challenging intricacies of programming language JavaScript. Gareth has produced the first compositional, precise formalisation of the Fundamental Interfaces of DOM Core Level 1, and used context logic to reason about DOM programs. He has used context logic to reason about mashups, and is the first to apply program reasoning to a substantial part of JavaScript. He is now working on improving and automating his JavaScript reasoning. The main conceptual challenge in reasoning about DOM, mashups and JavaScript lies in their use of complex, large, global data structures: the DOM tree of a web program, the web resources accessed by a mashup, and the heap of a JavaScript program. Resource reasoning with context and separation logic provides a previously impossible level of modularity in program reasoning about these structures. This modularity will make it possible to reason about large real-world programs, and dramatically improve the reliability of web technologies.

Before starting his PhD, Gareth studied computation at Oxford and spent several years writing software – both as an independent consultant and as an employee of organisations as diverse as a small internet startup and the BBC.

Gareth has been involved in a number of open source projects, most recently conceiving of, founding and leading the Womobile project (<http://www.womobile.com>), which provides a thin-client framework for consuming interactive and potentially location-aware media on mobile phones. One of the more interesting characteristics of this system is the potential it allows for inter-game communication. This presents the possibility of producing massively multiplayer cross-game communities, and games which are both community-focussed and also ultra-personalised. This work was first presented at the open source conference Over The Air event 2008 (<http://overtheair.org>). Gareth has since provided consultancy to the BBC with the aim of adapting the womobile project to their needs.

PROGRAMMING EXPERIENCE

Extremely Proficient (having delivered large, reliable, public facing projects) with:
Java (1.3, 1.4, Java 5 and Java 6)
JavaScript
Perl
SQL (interbase, postgres and mySQL)
Very Proficient (having delivered substantial internal projects) with:
CSP (and FDR)
Haskell
Macromedia Flash (ActionScript/Flex)
Python
Visual Basic .NET
Proficient (having produced small internal and personal projects) with:
AspectJ, Bash, Basic (BBC basic, q basic, visual basic, VB.net), C, C++, C#,
Csh, corewar “redcode”, Lisp (scheme, emacs and common), Oberon, OCaml,
Pascal, Prolog, Ruby.
Extremely familiar with various markup languages and meta-languages including HTML, XML, LaTeX and DocBook.
Extremely familiar with various development tools and environments: version control systems (including cvs, subversion, darcs and git), modeling languages and

tools (including UML, CSP and FDR), IDEs (including Emacs, Eclipse, NetBeans, DrScheme and JBuilder) and bug tracking/project management systems (including Bugzilla and Trac).

EMPLOYMENT
HISTORY

Research Associate, Imperial College (Nov 2010 - Present)

Using context and separation logic to reason about JavaScript, mashups and DOM programs.

Software/Media Consulting (August 2008 - Sept 2008)

<http://www.womobile.com>

Provided software/media consultancy to the BBC, with the aim of adapting the womobile project to their needs.

BBC Research and Development (Sept 2003 - Dec 2005)

<http://www.bbc.co.uk/rd>

R&D Engineer, working on a range of projects:

A feasibility study into using Bayesian networks to automatically diagnose faults in the national digital television distribution and contribution networks, with recommendations for future, more practical work;

A project to implement a web-based application to allow land developers to better understand the effect that large moving structures (such as wind turbines) are likely to have on local analogue television reception;

The re-design and implementation of the department's internal set of image manipulation tools;

The design and implementation of a fledgling set of open source media streaming and manipulation tools, for presentation at the open source conference OpenTech2005;

The design and implementation of components of the concurrent networking/communications infrastructure known as Kamaelia:

<http://kamaelia.sourceforge.net>

Decisionsoft Ltd (Easter 2001 - Sept 2002)

<http://www.decisionsoft.com>

Regular intern work, for periods ranging from two to six months. During these placements, work included developing the company's flagship product "X-Meta" - which is an innovative metadata management application, described at: <http://www.decisionsoft.com/xmeta.html>

The final (six month) placement was spent radically re-designing the product to meet a whole new set of challenges that the business had identified.

EDUCATIONAL
HISTORY

Imperial College, London (Jan 2006 - Nov 2010)

PhD Student – studying resource reasoning about web programs.

Publications:

PhD Thesis, Local Reasoning about Web Programs

VSTTE Theory, Resource Reasoning about Mashups

PODS 2008, Local Hoare Reasoning about DOM

Plan-X 2008 (a POPL workshop), DOM: Towards a Formal Specification

Referee Experience:

Oakland 2011, IEEE Symposium on Security and Privacy

CSF 2009, Computer Security Foundations Symposium

University of Oxford, Balliol College (Oct 1999-Jul 2003)

Computation (BA Hons) 2:1

Including a final year project to use the language CSP to simulate the "nervous system" of a millipede inspired notional robot.