

William Blum

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▷ EDUCATION

- 2005– **University of Oxford** (United Kingdom), DPhil in Computer Science.
2003–2004 **University of Oxford** (United Kingdom), MSc in Computer Science obtained with Distinction.
2001–2003 **Institut d'Informatique d'Entreprise**, Évry (France), Postgraduate School in Computer Science affiliated to the *Conservatoire National des Arts et Métiers (CNAM)* for the training of computer scientists and engineers.
1999–2001 **Lycée Victor Hugo**, Besançon (France), Intensive preparation for the competitive nationwide entrance examination to French engineering schools ("*Grandes Écoles d'Ingénieurs*").
1999 **French Scientific Baccalauréat** (equivalent of British A level) passed with distinction with special emphasis on maths and physics.

▷ WORKING EXPERIENCE

- Jan. 2008– **University of Edinburgh**: Research Assistant
Oct.-Dec. 2005 **University of Oxford**: Demonstrator on *Network & Operating Systems* practicals (Hilary 2005); tutoring *Specification* classes (Michaelmas 2005).
Jun.-Sep. 2003 **Franche-Comté University Computer Laboratory (LIFC)**, France, three-month internship: Modelling of the *Common Electronic Purse Specification* using B formal method.
Jun.-Aug. 2002 **Digital Surf**, Besançon (France) ten-week internship: development of a 3D display engine for metrology surfaces.
Oct.-Dec. 2001 **French Health Ministry**, 35 study-day mission: development of a C API used by hospitals to access a proprietary database.

▷ SKILLS

Languages spoken:

French: native, *English*: fluent, *Italian*: working knowledge, *Chinese*: beginner.

Computer Technologies:

OS: Windows, Linux, Solaris; *Languages*: C/C++, Caml, OCaml, F#, Prolog, Pascal, Visual Basic, Java, Fortran, Windev, x86 & 68k assembly, Perl, Matlab; *API*: OpenGL, DirectX, ActiveX, MFC, COM, Corba; *Web*: HTML, PHP, SQL; *Protocol*: TCP, UDP, FTP, HTTP; *Formal method*: B, Z, Promela, CSP, NuSMV; *Others*: T_EX, L_AT_EX, CVS/SVN.

Research interests:

- Theoretical Computer Science (λ -calculus, complexity theory, algorithms, formal verification, graph theory);
- Computer Graphics (3D rendering, lighting, shadow, surface representation, robot modelisation).

▷ AWARDS & GRANTS

- Member of the French team at the **international computer science contest IOI**, Turkey, 1999;
- Ranked *7th* at the French national computer science contest *Prologon*, 1999;
- **Jury Prize** and **High-school Prize** in the *Soft Qui Peut* contest in 1996 for the development of a pedagogical stock management software;
- **EPSRC grant** funding a 3 years DPhil course at Oxford, Jan. 2005-Dec. 2007.

▷ PAPERS & TALKS

- *The Safe Lambda Calculus* with C.-H. L. Ong, In Proceedings of the 8th International Conference on Typed Lambda Calculi and Applications (TLCA07), LNCS 4583;
- *The Safe Lambda Calculus*, talk, BCTCS2007 (British Colloquium in Theoretical Computer Science);
- *Termination analysis of lambda calculus and a subset of core ML*, talk, BCTCS2005.

▷ CONFERENCES ATTENDED

Bonn Games Spring School 2005; BCTCS 2005; PAT 2005 (Program Analysis and Transformations); Marktoberdorf International Summer School 2005; CSL 2005 (Computer Science Logic); BCTCS 2007; TLCA 2007 (Typed Lambda Calculi and Applications).

▷ DESCRIPTION OF INTERSHIPS

Univerty of Franche-Comté Computing Laboratory (France), 2003: I worked in the *Formal and Constraint Techniques* team that develops tools for validation and verification of critical softwares (<http://lifc.univ-fcomte.fr/>). I produced a mathematical model of the *Common Electronic Purse Specification* using the B formal method which has been used as a benchmark for the test-case generation tool *BZTT*. This model permitted me to detect bugs and missing features in the tool, leading eventually to its improvement. This internships required me to read and assimilate the 300-page CEPS specification as well as produce several notes presenting and clarifying it.

Digital Surf, 2002: Digital Surf (<http://www.digitalsurf.fr/>) is a leader in surface metrology and image analysis technologies. My job during this internship consisted in rewriting completely the outdated 3D visualization system that was integrated in the software *MontainsMap* and extending the user interface accordingly. This job taught me how to work within a small team on a pre-existing project of a substantial size. It also helped me to develop different skills: team-work, assimilation of source code written by others, object oriented programming in C++, use of MCF and OpenGL API, source control in Visual SourceSafe, 3D visualization techniques. My contribution had an important impact for the company: it helped them to modernize their software with cutting-edge 3D technology. Consequently, *MontainsMap's* 3D visualization capabilities became its flagship feature.

French Health Ministry, 2001: Implementation of a C API for the management of a proprietary database designed by the Health Ministry and used to surgical acts performed on patients at the hospital. Although the time allowed for the development was particularly short (contract signed on 18th October for a delivery date of 20th December), I have managed to see the project through completion in due time while pursuing my studies concurrently. This API is now used by software engineering companies developing softwares for hospitals and other medical establishments.

▷ PROJECTS

Academic:

- DPhil thesis: It is concerned with a syntactic restriction for higher-order programming languages called *Safety*. This property has nice algorithmic properties (it can be characterized in terms of pushdown automata) and lends itself well to the field of software verification (the MSO logic on infinite trees generated by safe higher-order grammars is decidable (with a complexity of n -EXPTIME for an order- n grammar)).
- Model checking tool in OCaml/C++: This is joint work with Matthew Hague and Luke Ong. We developed a SAT-based model checker in OCaml/C for verifying Linear Temporal Logic formulae on finite state machine programs expressed in the NuSMV specification language. Our approach combines McMillan's acceleration technique for the SAT-based Bounded Model Checking problem based on Craig interpolants, together with the use of Linear Weak Alternating Automata.
- MSc project thesis: I developed in OCaml a termination analysis program for Core ML programs based on the Size-Change Termination technique invented by Neil Jones *et al.*

Projects achieved during spare-time:

- 3D rendering engines with software-based rendering pipeline written in Caml light and in C++;
- Hardware chip-card reader for user identification;
- Cracklock: a software utility for Windows performing some very useful Win32 Kernel API hooking;
- \LaTeX compilation daemon tool;
- Various small games in C++/Visual Basic;
- Designing of a 3D animation sequence using a Silicon Graphics station at CNBDI in Angoulême (France).

▷ REFERENCES

Professor C.-H. Luke Ong (lo@comlab.ox.ac.uk)

Dr Andrzej Murawski (Andrzej.Murawski@comlab.ox.ac.uk)