

# CV For Dr Alexander J Turner

International level expert in software systems development from high performance, low latency data processing systems through to compiler design and implementation: From my most recent work on a novel compilation and runtime implementation for General Electric's Magik geographical information system through to the [patent pending] COBOL to JVM compiler with Micro Focus and on back to scientific high performance computing, my cutting edge career has encompassed many of the technologies which have shaped 21st century software engineering.

## 2011 - Present, Contract Developer Specialist: '*Project Alchemy*', C++/JNI library & novel JVM/Java compiler General Electric's New Magik GIS Implementation.

a) As part of a top level team I am a developer and architect on this novel compilation system. I designed and implemented the high reliability, high performance JNI interface in C++ and C (lead platform Visual Studio) and Java. This amazing team utilizes a full gamut of agile techniques to provide extreme productivity.

b) I am technical lead for the native C++ implementation along with the high throughput, low latency JDBC implementation using advanced JNI interfacing techniques and Hadoop/AVRO data transmission over non-blocking systems IO. This is built on the high throughput, lock-free, thread consistency model I designed for the Alchemy runtime.

b) In this, my second major commercial compiler implementation, I have worked on the parser, semantic analyser and code generator (to Bytecode) plus architecting the runtime interface to native C++. Testing of the compiler front end is in Scala. The compiler uses the ultra-new invokedynamic features of the JVM 7 implementation from Oracle.

c) One of the project's aims is to bring new UI technologies to the legacy system. We are working with HTML5, Java 3D and Java 2D to this end.

d) Building on my experience bringing agile to the Micro Focus compiler team, I have been, in collaboration with an applied psychologist, developing new ideas for this already highly agile/DDD team using modern psychological concepts to enhance project performance.

f) *In brief:* Magik GIS, C, C++, Java 7, HTML5, Antlr, Invoke Dynamic, Compilers, JNI, Scrum, Agile, Lean Start-up, DDD, ASM4.0, Maven, Ant, Ivy, Hadoop, Avro, JDBC (driver development), Boost, Bytecode, Scala, Thread Modelling / Lock Free Semantics.

**Research:** [Agile methods](#), [Functional/Object Oriented interactions](#), [Other](#): Improving the way we write software and enhancing agile methods are passions of mine; I research and implement in these areas constantly both with my clients and in my own time.

### Education

- 1) BSc 2.1 Chemistry at the University of Leicester.
- 2) Ph.D. Computational Quantum Mechanics at the University of Bath.

## 2008 – 2011, Software Systems Developers Senior Principal, Micro Focus

### International.

- a) Starting as lead architect for the new licensing system (C,C++,C#, Java) I rapidly moved on to advanced cloud computing research into COBOL (and its C# runtime) in the Azure cloud. I then move to lead the .Net/JVM\*/COBOL compiler development team taking the Micro Focus JVM COBOL product to General Availability from scratch in less than 2 years. We also implemented legacy UI technology in C#, enhanced the performance of the .Net compiler and engaged with development of the Visual Studio .Net COBOL product. *\*Note that JVM stands for Java Virtual Machine.*

- b) Micro Focus is a world leader in COBOL and testing technologies whilst being a FTS500 company. I was at the top of the technical strata at this cutting edge company. I ran the green field COBOL/Java project team. I learned COBOL from scratch to take on the project and then continued to write parts of the compiler in COBOL and the runtime in Java, C and C++. My coding responsibilities also took in JNI interfacing between legacy and JVM code. I also coded parts of the .Net compiler and in the C# language whilst becoming familiar with il and other low level .Net technologies.
- c) I designed and helped implement the hardened, encrypted licensing system which Micro Focus now uses for its entire product portfolio. The development was in C, C# And Java. The requirement for pure C led my development of a dynamic C architecture permitting enough polymorphic dispatch to permit the required flexibility for the problem domain. Key requirements of this project were portability, security, reliability and very low latency.
- d) I was responsible for creating and developing several novel algorithms for solving challenges in the JVM space. I created a unique approach for splitting large JVM bytecode blocks into smaller methods which goes towards the patent pending on for the entire COBOL to JVM implementation on which I am co-author. I was also created the implementation of a high performance high precision mathematics sub-system as well as a new approach to handling the marshalling of multiple threads through the COBOL runtime state.
- e) Along with the very high performance / low latency requirements of the licensing system I was involved in a substantial effort across the COBOL space (C++,C , C# and Java for the runtime system) to increase file handling performance and create low latency read write architectures for serializing COBOL data in and out of SQL Server and Oracle databases.
- f) **In brief:** Team lead, Compilers, High performance / multi-threaded architecture, .Net, C#,F#, IL, CLR, Java, JVM, JNI, JVM/Java Optimization, Linux, Unix (AIX, Solaris) and Windows, COBOL, C++/C/STL/Boost, IPC, Full life cycle algorithm development, Scrum, Agile, Mentoring, Linux, Windows, Unix (Sol aris, HPUx, AIX),Cloud,EC2,Hadoop, Customer Facing.

## 2008, Associate Lecturer with the Open University (weekends and evenings whilst working at The Project Network)

- a) Associate lecturer for a first year coarse in computer programming with the Open University. In this position I was trained in mentoring, communication, lecturing and equal opportunities. This was entirely spare time for personal satisfaction and learning.

### Publications

- 1) Transition-state structural refinement with GRACE and CHARMM: realistic modelling of lactate dehydrogenase using a combined quantum/classical method  
*Chemical Communications, 1997, 1271 Vicente Moliner, Alexander J. Turner, Ian H. Williams.*
- 2) Transition-state structural refinement with GRACE and CHARMM: Flexible QM/MM modelling for lactate dehydrogenase.  
*Physical Chemistry Chemical Physics, 1999, 1, 1323 Alexander J. Turner, Vicente Moliner, Ian H. Williams .*
- 3) Linear scaling geometry optimisation and transition state search in hybrid delocalised internal coordinates  
*Physical Chemistry Chemical Physics, 2000, 2, 2177 Salomon R. Billeter, Alexander J. Turner, Walter Thiel.*
- 4) Combined Quantum/Classical Modelling of Chemical Reactions in Enzymes and Solution.  
*University Of Bath, 1997, Alexander J Turner.*
- 5) A device for the conversion of COBOL source code to JVM Bytecode – **patent pending.**

**2004-2008, Senior Software Architect, The Project Network Ltd. [Note, TPN bought JDIT and I joined the team]**

- a) VB.net, C#, C++, Data processing and cleansing, Java, MS SQL Server (TSQL and stored procedures), RDMS Design, Consulting, Architecture, SDLC and agile full life cycle planning, high performance / multi-threaded socket communications, AJAX, web development, off-shoring, team lead, mentoring, Architecture, off-shoring.
- b) .Net - creation of the TAG.net application gateway (VB,.Net, winsoc, Windows system api etc., C++ and COM). TAG a unique high throughput, soft real-time constrained web serving platform to allow heavy loading of low end hardware without system failure.
- c) Consulting into HP on a very large Java/Weblogic/Oracle project for the London Clearing House.
- d) C++ - creation of the TPN service manager and registry tools plus C/C++ extension of PHP to allow COM object caching for high performance web serving.
- e) Replacement of complex business processes with streamlined IT approaches based on tight integration with MS Office, especially MS Excel (see my [book](#) introducing the concept).
- f) MS-SQL Server design and implementation of DeployView and Datamuncher databases as part of DV team plus numerous small projects.

**2002-2004, (including TPN above, 2002-2008), Owner of JDIT Systems, software development company. Clients, Project Network. Daimler Chrysler, MD Ltd, Project Network Ltd, Ocado Ltd etc.**

- a) Development of Oracle/Java messaging systems to support Ocado's warehouse replenishment and ordering systems.
- b) Major rework of J2EE/Weblogic based business systems from to pure Java/PL-SQL.
- c) Designed and built the JDSC stock control system in MS-SQL/TSQL with pure Excel GUI.
- d) Multiple other Excel/MS-SQL and VB based projects.
- e) Design, build and support of network based automated hardware and software auditing tools.
- f) Consulting on major software projects from automated software delivery to Java/JEE financial trading systems into HP.
- g) PL/SQL, Oracle, J2EE, JMS, MQ Series, Java, Warehousing, VB/VB.net, MS SQL Server, high throughput transactional processing, Architecture, customer facing, Linux, Unix (Solaris).

**2001-2002, Principle Developer, Armature Retail Systems Ltd.**

- a) Development of J2EE systems based on Weblogic for the retail industry.
- b) Advanced work on JMSE using XML and XSLT for message processing and translation.
- d) SOAP integration from J2EE to C++/STL.
- e) Design and development of PKI based message encryption and authentication within JMSE framework.
- f) On-site support of software supplied to Ocado from Armature.
- g) Cross disciplinary teaming between Professional Services and Software Development.

**2000-2001, Principle Systems Architect, Enformedia Ltd.**

- a) Designed and implemented a media advertising auction and reverse auction web system.
- b) Designed/Implemented RSA secure-id server solution in C++ and TCL.
- c) Development, implementation and deployment of object relational systems for support of flexible auction design.
- d) Hardware and software architectural specification to meet defined load and performance levels.

**1998-2000, Senior Software Consultant for Tripos Inc.**

- a) Java, CORBA, C++, Perl, SQL, Oracle, UML, customer facing, on site consultancy and analysis, Unix (IRIX and Solaris), Windows.
- b) Software Consultancy training and project management trained.
- c) On site implementation of Java/Corba chemical database analysis tools across Europe.
- d) OMG specification design for chemical entities.

**1997-1998, Research Fellow in quantum/classical mechanical modelling at the University of Zurich.**

- a) Continuation of similar work to that done at Bath (see below).
- b) Development of Java based molecular visualization software combining mathematical modelling with AWT rendering to produce real time manipulatable 2D shadows of 3D molecular models.
- c) Commercial development of RDMS for Zurich based taxi company.

**1995-1997, Studying Quantum/Classical hybrid computer modelling of enzyme kinetics for a Ph.D. at University Of Bath.**

- a) C++, TCL/TK, FORTRAN plus several specialist packages. Language interoperation to automate complex interactions between dissimilar technology domains.
- b) Programming Unix work stations and Cray super computers including massively parallel computing.
- c) Mathematical modelling and implementation of multi-layer structural optimisers for QM/MM molecular modelling leading to elucidation of theoretical transition state structures for aqueous solution and enzymatic catalysed reactions.
- d) Use of visualization to enhance human to computer model interaction. Pushing the state of the art in real time viewing of calculations to reveal the behaviour of computer models.
- e) Functioning as part of an international research team.

**1992-1995, Director: PAV DataSystems Ltd.**

Free space laser network and video transmission design of digital electronics and computer software systems. Low level signal processing theory and implementation for G703, Ethernet and Token Ring. On-site installation of electronic equipment, notably at several UK nuclear installations leading to special training etc. Pre and Post-sales support and sale closing experience. Optical design and atmospheric transmission modelling.

**Other Interests**

As well as my blogging, I have been active in image and video processing. My development of a simple approach for [Synthetic Slow Motion](#) has reached the number 1 spot on Google searches and has been translated to many languages, including [Chinese](#). I have also been very active in [podcasting](#), [video generation](#) and real time audio processing to achieve efficient creation of professional podcast sound quality and special effects.\* My site [Nerds-Central](#) has one million per annum hit rate whilst my Youtube channels achieves 1000 views a week.

\* My Sonic Field research project uses immutable, arbitrary complexity linear algebra for non-real-time *ab-initio* audio synthesis, editing and mastering. In so doing it pushes the art of numeric and parallel programming in Java.

To unwind from all this technology, my [two spaniels](#) help a lot. I also love walking, gardening, playing the sax', renovating our traditional Oxfordshire thatched cottage and my interest in vintage cars.

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