Post: Webel IT Australia, PO Box 1816, Bondi Junction, NSW 1355, Australia **Tel:** +61 (2) 9386 0090 **Mobile:** 0405 029 008

Model-based software engineering and systems engineering résumé:

Java EE, XML, UML, SysML, C++, RDF/S OWL

Dr Darren R. C. KELLY

Webel IT Australia consultancy (established 2000)

Version date: 01 Aug 2016

The focus of this résumé is on experience with the development of database-driven web applications using Enterprise Java (Java EE), JavaServer Faces (JSF), and XML – mostly supported by graphical architectural analysis and model-based software engineering with the Unified Modeling Language (UML) and systems analysis with the Systems Modeling Language (SysML). It also covers promotion of the above technologies through IT Training courses and online education. Experience with semantic web and ontology technologies such as RDF/S and OWL - which increasingly overlap with model-based engineering - is also described:

- The latest version of this résumé is available online at: `https://www.webel.com.au/resume/mbe`
- A database-driven table of IT skills is available at: `https://www.webel.com.au/view/technologies`
- A full-career *Curriculum Vitae* is available as an online database at: `https://www.webel.com.au/cv`
- Professional references will be made available on request only.

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1) Personal details and contact information

Full name:	Dr Darren Raoul Charles KELLY, BSc, PhD
Birthplace:	Sydney, Australia
Nationality:	Australian
Languages:	English and German
Business name:	Webel IT Australia (trading as WEBEL.COM.AU)
Australian Business Number (ABN):	67 677 268 579
Business postal address:	PO Box 1816, Bondi Junction, NSW 1355, Australia
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Mobile/Cell:	0405 029 008
Email:	Please visit[1]: https//www.webel.com.au/contact
Web:	https://www.webel.com.au
LinkedIn:	https://www.linkedin.com/in/drdarrenkelly

1 For spam prevention direct email is only provided after the initial contact because this document is also made available online.

2) Software and systems engineering career profile

In the following description, the terms 'model-based' and 'model-driven' do not refer only to generation of computer code through forward engineering, they refer also to graphical modelling for architectural analysis and for requirements and feature engineering, as well as to reverse engineering and refactoring of existing systems.

My name is Dr Darren Kelly. I specialise in applying graphical software engineering and model-based development to tasks in information technology, industry, engineering and science. I am an advocate for the combination of graphical *Unified Modeling Language (UML)* with object-oriented software engineering languages such as Java and C++ and data languages like XML/XML Schema, as well as graphical systems analysis with *Systems Modeling Language (SysML),* where possible in combination with executable systems.

History: I was originally trained in computational physics and mathematics, and I have applied scientific computing techniques to analysis, modelling, simulation and control of many complex systems including: astrophysical systems such as supernovae; scientific instruments such as radio telescopes, particle accelerators and neutron beam instruments; control systems for scientific instruments; nuclear physics; scientific data analysis; biological population dynamics; secure internet architectures and middleware; data analysis and meta-modelling; cognitive science, semantic networks, and linguistics.

I have programmed computers since I was a young teenager. I have used many low-level historical languages and command many modern object-oriented, patch-based, and symbolic computer languages. After applying computer programming to tasks in science from 1988-1999, I developed an interest in web and internet technologies, next-generation computer languages, software engineering methodologies, and emerging web standards - in part through my exposure from 1994-1998 to early web browsers and web technologies at the Deutsches-Elektronen Synchrotron (DESY) particle accelerator institute in Hamburg, Germany, a sibling institute to the CERN particle physics institute, the "home" of the World Wide Web (WWW).

At DESY I was also introduced to object-oriented software engineering with C++ and to the graphical engineering technologies and specifications of the Object Management Group (OMG) such as UML.

In 2000, I established **Webel IT Australia** as a *Scientific IT Consultancy* promoting applications of modern IT to tasks in industry, engineering, commerce, science, and education. My primary object-oriented language is currently Enterprise Java (Java EE) and I also work extensively with: XML Schema for data modelling; C++ for real-time embedded synthesis applications; and with object-oriented PHP, JavaScript, jQuery and Cascading Style Sheet (CSS) language for web development (typically in combination with Drupal CMS).

I am a graphical UML "evangelist" and have used UML together with many other software engineering technologies and for modelling web architectures and enterprise systems. As a consultant to No Magic Inc. - developers of the popular Java-based MagicDraw UML development tool - I advised industry partners and engineering customers on the use of graphical UML for software engineering, and I headed re-development of the graphical Systems Modeling Language plugin for MagicDraw UML. I am likewise an advocate for the use of reusable *Design Patterns* for software engineering and architecture described in graphical UML.

I am an expert in applying UML to model-based requirements analysis, systems analysis, component design, domain and data modelling, code re-factoring, and to migration of Java and XML software systems. I have reverse-engineered and graphically analysed many Java and XML Schema systems, and I am familiar with many modern enterprise architectures and web frameworks. I am the developer and promoter of the Webel recipe for *UML Parsing Analysis*, a technique for translating domain texts, documentation, and requirements descriptions into graphical UML and SysML models by binding text to UML analysis and design elements for implementation of executable Java and XML software components through forward-engineering, and by binding API docs and tutorials to reverse-engineered elements representing existing code components.

I have supervised strongly requirements-driven and feature-oriented Java software development projects, and I have overseen entire software development processes through analysis and design to implementation and testing, using UML for model-based Java and C++ design and refactoring, freestyle architectural analysis, project tracking, and for documentation. I am experienced with *Agile Software Development* practices and the JIRA issue tracking system, and I am fluent in popular software repository and versioning technologies like Git and Subversion for collaborative team-based software development.

I have experience with most major Software Development Lifecycles, and I have used graphical UML to support model-based software development. I have also lectured on software engineering practices.

I am still a hands-on Java coder, and I use core Enterprise Java technologies such as the Java Persistence API (JPA) for object-relational database mapping, JavaServer Faces (JSF) for rich interactive web user interfaces, distributed computing technologies such as Java RMI, and Java web services support.

I have worked extensively with most variations on Java database-engineering for complex data mapping and domain-model entity persistence tasks, including: low-level SQL queries and SQL database administration; JDBC; object-relational JPA for Enterprise Java (including Hibernate and EclipseLink); relational database management systems such as MySQL and Oracle DB; and pure-object databases for Java (ObjectDB).

I favour core Oracle/Sun technologies such as pure Enterprise Java architecture (over Spring) with modern JavaServer Faces rich web UI/UX, but in combination with the JPA-compliant ObjectDB database. I use the 3rd-party PrimeFaces and OmniFaces JSF web interface toolkits extensively in combination with core JSF.

I am experienced with XML-based data modelling including: graphical and generative XML Schema design; XSL transformations for XML-to-XHTML; XML-based security technologies such as SAML and XACML; and WSDL for SOAP and WADL for REST web services. I have reverse-engineered many XML Schema to graphical UML, and am also familiar with popular commercial XML tools like Altova XMLSpy.

I employ a wide range of forward-engineering technologies for Java and XML, including many graphical UML tools (especially MagicDraw UML, on which I worked), the Java-based Eclipse Modeling Framework (EMF), Eclipse XSD for manipulation of XML Schema in Java, OMG Model-Driven Architecture (MDA), and my own custom Java forward-engineering systems from Webel IT Australia client projects.

I fully command Integrated Development Environment (IDE) programming support for Java and XML, including popular IDEs such as NetBeans, Eclipse, JDeveloper, and Apple's Xcode, and their debugging and profiling facilities. I likewise command administration of Java web application servers such as GlassFish, JBoss, and Tomcat, including deployment to remote dedicated servers, virtual private servers, and to Amazon Web Services (AWS) elastic cloud computing servers.

I employ JRebel "hot deployment" live reload technology for rapid Java EE web application development.

The development of the Java EE web application **GreenDesk** since 2011 for venture startup client GreenSoft provides the most comprehensive example to date of my integration of Enterprise Java technologies, XML, and model-based graphical UML software engineering. It employs *Expert System* strategies for analysing and tracking the complex data and documentation required for preparing applications for the Green Star Office sustainable building rating system of the Green Building Council of Australia (GBCA), using rich interactive JavaServer Faces (JSF) worksheets, and a *Building Project Model* in a JPA-compliant object database.

The *Resource Description Framework (RDF)*, *RDF Schema (RDFS)*, and *Web Ontology Language (OWL)* technologies of the World Wide Web Consortium (W3C) increasingly impact on and overlap with domain modelling with UML and SysML, as expressed through the OMG's *Ontology Definition Metamodel (ODM)* specification. I have worked on projects involving these semantic web technologies and popular RDF/S OWL ontology modelling tools, and I increasingly incorporate aspects of semantic web strategies into model-based engineering projects.

2.1) Java, XML, UML and SysML education and IT Training

I have lectured and trained students, software developers, and other IT professionals in advanced software and systems engineering techniques. I have promoted graphical UML, SysML, Java, and XML through development of courses and workshops, through foundation in 2007 of the online MagicDraw UML eSchool, and through educational online IT examples on Webel IT Australia web sites. I offer advanced Java, UML, and SysML training courses and workshops for IT professionals and engineers through Webel IT Australia.

For many years I have used *Content Management System (CMS)* web site technology – and since 2007 primarily the PHP-driven Drupal CMS system - to promote graphical and model-based software engineering and systems engineering technologies through online IT education and IT courses, as well as examples of applications of these technologies through online examples from my own research and development projects.

3) Record of employment, consultancy, IT Training and R & D activities involving model-based software and systems engineering with Java, XML, UML, SysML, C++, and OWL

In approximate reverse chronological order, in some cases with some overlap

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May 2016 – Jun 2016: IT Consultant under contract via Webel IT Australia to the National eHealth Transition Authority (NEHTA) IT agency for the Australian government:

- Investigated and reported on the use of semantic web technologies (RDF/S, OWL, Turtle) in the HL7 *Fast Healthcare Interoperability Resources (FHIR)* project. Helped with colleagues to collate and classify ontology modelling best practices and policies drawn from authoritative sources.
- Explored graphical representations of FHIR RDF definitions in the Protégé and TopBraid Composer RDF/S OWL ontology modelling tools.
- Employed graphical UML representations of the XML Schema for FHIR RDF definitions, and investigated FHIR XML instance examples.
- Assessed Java libraries for parsing and transformation of RDF ontology models.
- Reported on adaptations of UML for semantic web modelling, including the *Ontology Definition Metamodel (ODM)* specification of the Object Management Group (OMG) and related tool support.

Apr 2016: Webel IT Australia: preparation of systems engineering training materials for a custom IT Training seminar in the OMG's System Modeling Language. Updated training materials to reflect changes in the SysML1.4 version and tracked changes proposed by the OMG SysML1.5 Revision Task Force (RTF):

- *Examples of Webel IT Training materials for SysML and UML are available online and on request.*

Mar 2016: Chief Software Architect for venture startup GreenSoft Pty Ltd, Australia:

- Ongoing development of the Java EE web application **GreenDesk** for analysing and tracking the complex data and documentation required for preparing applications compliant with the Green Star Office sustainable building rating system of the Green Building Council of Australia (GBCA).
- Primarily JavaServer Faces (JSF) development for rich interactive *Expert System* worksheets.
- `http://greendesk.greensoftaustralia.com`

Oct 2015 – Feb 2016: IT Consultant under contract via Webel IT Australia to the National eHealth Transition Authority (NEHTA) IT agency for the Australian government:

- Investigated and reported on the use of the Object Constraint Language (OCL) and the Unified Modeling Language within the UML/EMF/Java/XML-based Model Driven Health Tools (MDHT) project for use with the HL7 Clinical Document Architecture (CDA) XML-based markup standard.
- Created database-driven tables of OCL constraints for analysis and categorisation using a CMS site.

Jun 2015 – Aug 2015: IT Trainer under contract via Webel IT Australia to the National eHealth Transition Authority (NEHTA) IT agency for the Australian government:

- Developed and presented live a custom IT Training course on the Object Constraint Language and the Unified Modeling Language of the Object Management Group for use with the Model Driven Health Tools suite for HL7 CDA. Included preparation of printed, bound, training-slide materials. *[Examples of the training materials kit as PDF are available on request, subject to approval.]*
- Created online versions of the training materials using a Content Management System web site. *[Private registration site, access available on request only, subject to approval.]*

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17 Jan 2011 – 09 Feb 2014: Chief Software Architect for venture startup GreenSoft Pty Ltd, Australia:

- IT Consultant: Enterprise Java (Java EE) software engineer, systems architect, web app developer.
- Developed a unique Java EE web application **GreenDesk** for analysing and tracking the complex data and documentation required for preparing applications compliant with the Green Star Office sustainable building project rating system of the Green Building Council of Australia (GBCA).
- Used *Expert System* technology in Java as an intermediary between rich interactive web user interfaces for green credit worksheets using JavaServer Faces (JSF) and an underlying Enterprise Java domain entity database model - a *Building Project Model*, created using *UML Parsing Analysis* technology to map the Green Star Office specifications to domain element policies and credit rules.
- After initially using a MySQL database with object-relational Java Persistence API (JPA) mapping with EclipseLink, then an object-relational Oracle DB with EclipseLink, a major migration was made to a JPA-compliant pure-object database ObjectDB, with significant speed improvements.
- The PrimeFaces toolkit for JavaServer Faces (JSF) was used to enhance the rich web user interface.
- Employed UML for requirements and domain analysis, model-driven Java design, code refactoring, documentation, and for freestyle graphics presentations for non-experts. The related OMG Systems Modeling Language dialect heavily influenced the *Building Project* domain entity model design.
- Custom scripting was used to generate Enterprise Java database entity classes directly from a Drupal CMS web site entity-relational database model of the Green Star Office technical manual's specification for the green office building rating system of the Green Building Council of Australia (GBCA). Such novel and advanced automation of coding is a speciality of Webel IT Australia.
- `http://greendesk.greensoftaustralia.com`
- `http://www.greensoftaustralia.com`

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27 Jul 2010 – 16 Jan 2011: IT Consultant: domain analyst and web developer for ecoSmart Building Pty Ltd:

- Developed a Content Management System web site (for internal use only) with an entity-relational *Parsing Analysis* database model of the Green Star Office technical manual's specification for the green office building rating system of the Green Building Council of Australia (GBCA). The entity-relational analysis model formed the basis of a later Java domain database entity class code design.

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04 Sep 2009 – 06 Jan 2010: IT Consultant: migration and development of a Content Management System web site for the Systems Engineering and IT Training organisation Project Performance International (PPI):

- Performed highly automated database migrations of legacy web site content and user/customer data.
- Included reviewing 1000s of software engineering and systems engineering resources/documents.
- 2016+: Under ongoing administration by Webel IT Australia on a Dedicated Server:
  - `http://segoldmine.ppi-int.com`

Sep 2009 – Oct 2009 UML and SysML education: Systems Engineering and IT Trainer for the Australian Defence Science and Technology Organisation (DSTO) and the Royal Australian Air Force (RAAF):

- Used the Java-based MagicDraw UML tool and SysML Plugin to teach graphical requirements analysis and advanced domain modelling for systems engineering and software engineering.
- Example slides and diagrams from the course *"Practical systems engineering with the OMG's Systems Modeling Language (SysML) and the MD SysML Plugin for MagicDraw UML"* are available online (and also as a PDF slide kit sample on request):
  - `https://www.webel.com.au/course/sysml/mdsysml/sysml-1-2`

Nov 2008 – Mar 2009: Webel IT Australia (consultancy): web development for IT education and business:

- Developed a Content Management System (CMS) IT consultancy site: https://www.webel.com.au
- Includes 1000s of pages of educational examples of model-based engineering with Java and XML, graphical software engineering with UML, graphical systems engineering with SysML, and real-time patch-based synthesis, including live examples from Webel research and development projects.

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01 Oct 2008: Webel IT Australia (consultancy): software research & development for nuclear science:

- Further development of a Java-generated XML Schema (known as NeXML) and EMF Java bindings for the NeXus neutron and scattering science data format, for presentation to the NeXus International Advisory Committee (NIAC) meeting in Sydney on 30 Oct 2008 as a technical report and narrated screencast video presentation with live demonstration [2016+: still operational on Webel servers]:
- https://www.webel.com.au/nexml/report/niac2008/kelly_nexml_xsd_emf_niac2008.pdf
- https://www.webel.com.au/video/nexml/niac2008/screencast *(Web browser video player)*
- https://www.webel.com.au/nexml/report/niac2008/NeXML_NIAC2008.web_high.mov *(Direct)*
- https://www.webel.com.au/nexml *(Live JSP/XML/XSL transformation demo)*
- https://www.webel.com.au/project/nexml *(NeXML project home: historical, archival)*

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16 Apr 2007 – 15 Sep 2008*: Expert Advisor for Science, Engineering, and Education* to No Magic Inc. (developers of the Java-based MagicDraw UML application) - via IT consultancy Webel IT Australia:

- Worked internationally from Sydney with teams in Europe, Asia, and the USA, with frequent trips to the No Magic Asia Development Centre in Thailand to train developers and oversee software teams.
- Directed re-development of the Java-based SysML Plugin for MagicDraw UML:
  - Supervised Java development team members and managed a specification-driven process, applying the Webel graphical UML Parsing Analysis process to the SysML specification.
  - Improved traceable specification of requirements and features, testing, and bug fixing.
  - Introduced extended MD SysML metamodel stereotypes encapsulating implicit SysML specification concepts, using Domain Specific Language (DSL) modelling in MagicDraw.
  - Integrated a JIRA issue tracking system with metamodel-oriented feature analysis and SysML-based activity and tracking models for an Agile software development process.
- Established the MagicDraw UML Online eSchool with numerous UML examples, tutorial trails, and tips, especially concerning graphical, UML-driven Java software engineering and SysML.
- Developed and held workshops to train developers in UML-driven Java software development.
- Developed and held SysML systems engineering workshops using the MagicDraw SysML Plugin.
- Authored a SysML training course as PDF slides for customers and for use by other trainers.
- Provided priority customer assistance in UML and SysML to science and engineering customers.
- Supervised and promoted development of active validation features for MagicDraw UML/SysML:
  - http://www.youtube.com/watch?v=b66AWt-gyYY *(Narrated screencast tutorial video)*
- Represented No Magic Inc. at Object Management Group meetings of the SysML working groups and in revision of the SysML specification through the SysML1.2 Revision Task Force (RTF):
  - Proposed a new SysML metamodel for representing value states and physical quantities.
  - Proposed a SysML-based *Instrument Control and Simulation Modeling Language (ICSML):*
    - http://www.omg.org/cgi-bin/doc?syseng/2008-03-17 *(Presentation slides)*

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05 Oct 2006 – 04 Nov 2007: Software Architect, Neutron Beam Institute (NBI) Computing and Electronics Group, Bragg Institute within the Australian Nuclear Science and Technology Organisation (ANSTO):

26 Sep 2005 – 04 Oct 2006: Data Analysis Developer, NBI Computing and Electronics Group, Bragg Institute within the Australian Nuclear Science and Technology Organisation (ANSTO), Lucas Heights:

- Developed the first Java bindings and graphical UML models for the XML-based NeXus data format, as presented to the NeXus International Advisory Committee and now promoted through the NeXML sub-project web site (see also the summary of R&D with NeXML from Oct 2008 above):
  - https://www.webel.com.au/project/nexml
- Developed a distributed, pluggable, object-oriented, port-based *Instrument ModelServer* control system façade using Java and XML software engineering and UML/SysML systems engineering for the Neutron Beam Instruments (NBIs) of the OPAL research reactor at Lucas Heights.
- The use of graphical port-based UML2 Components for modelling NBIs and neutron transformation paths pre-empted the use of ports in the SysML dialect of UML for modelling physical flows.
- Developed port-based channel operator software in Java for data reduction and analysis using UML.
- Performed architectural modelling in UML of Java systems and heterogeneous control systems.
- Developed Java adapters for the low-level SICS control system and data acquisition web services.
- Performed Java and XML technology assessments, including analysis of reverse-engineered APIs.

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01 Aug 2004 – 01 Mar 2005: Object-oriented programmer and Unified Modeling Language analyst on the Meta-Access Management System (MAMS) project of the Macquarie E-Learning Centre of Excellence (MELCOE) at Macquarie University, Sydney, Australia. Java, XML, and UML-related activities included:

- Development of a federated resource search web client using XML, JavaServer Pages (JSP), XSL transformations, XPath, XML query language (XQuery), and resource metadata technologies.
- Reverse engineering, graphical modelling, assessment, and analysis of technologies such as: Security Assertion Markup Language (SAML), eXtensible Access Control Markup Language (XACML), the JAFER toolkit for Z39.50, DSpace repository, Dublin Core metadata schema, MARC21 and MARC XML metadata schema, OAI metadata schema, and the UKeduPerson schema.
- Introduction and teaching of applications of graphical UML to model-based Java and XML development with the MagicDraw UML tool to colleagues, including the port-based systems engineering paradigm for modelling and analysis of software architectures for web services.
- Modelling of the MAMS secure web services architecture and the Shibboleth secure single-signon federated access technology in UML: https://www.webel.com.au/shibboleth

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01 Oct 2003 – 01 May 2004: Consultant Programmer via business Webel IT to The Astrophysics Group, School of Physics, University of Sydney (for Dr. Anne Green, Director of the MOST radio telescope):

- Developed a Java-based information system and entity model for the MOST radio telescope using Java Data Objects (JDO) object-relational datanase mapping and JavaServer Pages (JSP) web technologies, as well as a Java3D modelling and animation client and a Java Swing desktop client:
  - https://www.webel.com.au/project/most
- Employed Unified Modeling Language analysis, design, reverse engineering, and documentation throughout the project in conjunction with the Unified Software Development Process.

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18 Aug 2003 – 19 Sep 2003: Research Assistant at the Centre for the Mind, University of Sydney:

- Developed a Java semantic word network analysis application using JUNG Java network graphing:
  - https://www.webel.com.au/jung

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06 Mar 2003 – 26 Jun 2003: IT Lecturer at the International Institute of Business and Information Technology (IIBIT), Sydney:

- Topics lectured included: Distributed Computing with Java, Software Engineering Process, Operating Systems, XML, and Analysis and Design for Java with the Unified Modeling Language.
- Supervised Java computer labs and marked exams and tutorials.

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26 Nov 2001 – 10 May 2002: Research Assistant at the VisLab, University of Sydney, Australian Technology Park. Activities included:

- Research and development of Java "ubiquitous" distributed computing demos (using event heaps).
- Development of Java object networking code and UML models for interactive spaces.
- Research into multi-channel ambisonics (3D sound fields) using the Lake DSP Huron system.
- Medical CT Scan and tomography visualisation using the Visual Toolkit (VTK) for C++.

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07 Aug 1999 – 23 Nov 2001: Sole-trading IT consultant and developer. Activities included:

- Ongoing development of Drancing, a gestural, non-tactile "body music" performance instrument employing 3D accelerometers as motion sensors for real-time generation of music, visuals, and controls from body movement, with Java Swing control GUI, Java-based real-time audio synthesis, and Java-generated visuals. Employed graphical UML models for software and electronics design.
  - https://www.webel.com.au/project/drancing

For a database-driven, online record of all employment, consultancy, and R & D activities please visit also:

https://www.webel.com.au/activities

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4) Appendix: Computing and Information Technology skills

Please also visit this online database of technologies: http://www.webel.com.au/view/technologies

Programming languages: Java, C++, PHP (including object-oriented), JavaScript, jQuery, DHTML, DOM. *Historical:* C, Perl, FORTRAN, Pascal, Awk, ELisp, various low-level machine codes and assembly codes.

Markup & web languages: HTML5/XHTML; XML, XML Schema (XSD), XSL Transformations, XPath; XMI for MOF; domain-specific XML languages; JSON; Cascading Stylesheet Language (CSS) and SASS.

Analysis, design, modelling: Design Patterns, graphical Unified Modeling Language (UML), Systems Modeling Language (SysML), XML Schema (XSD) language, Eclipse Modeling Framework (EMF), Meta-Object Facility (MOF), Object Constraint Language (OCL), Entity-Relationship (E-R) database design.

Software engineering tools: MagicDraw UML, Rational Software Architect (Rational Rose) UML, Netbeans IDE, Eclipse IDE, JDeveloper IDE, JIRA issue tracking. *Historical:* KDevelop, Borland C++.

Enterprise Web development: Enterprise Java (Java EE), JavaServer Faces (JSF), PrimeFaces for JSF, Java Persistence API (JPA), JRebel, GlassFish, JBoss, Apache HTTP server, Tomcat, Historical: JSP**.**

Distributed computing protocols: SOAP, WSDL, REST, WADL, Java RMI. *Historical:* CORBA, IDL.

Database technologies: SQL query language; Java Persistence API (JPA) object-relational mapping, JPQL, (EclipseLink, Hibernate); relational databases (MySQL, Oracle DB); pure-object databases (ObjectDB). *Historical:* Java Data Objects (JDO) and JDOQL; Oracle Berkeley DB XML; Tangram (Perl) OR-mapper.

Enterprise Technologies: Java EE, (Spring Framework), EMF, Service Data Objects, SOA, Oracle ADF.

Semantic web languages and tools: RDF, RDF/S, OWL, Turtle, RDF/XML, Protégé, TopBraid Composer.

Symbolic algebra: Maple, Mathematica, MATLAB/Simulink, Modelica, Mathcad. *Historical:* REDUCE.

Scripting languages: PHP, Bash. *Historical:* Zsh, Csh, Perl, Awk.

Software repository/versioning technologies: Git, Subversion (SVN).

Content Management System web site platforms: PHP-driven Drupal CMS, Plone CMS.

Graphical User Interfaces and APIs: *For web and mobile:* JavaServer Faces (JSF), PrimeFaces for JSF, JavaScript/jQuery, DHTML. *For desktop/laptop:* JavaFX, Java AWT/Swing, Eclipse SWT, Qt (cross-platform C++ GUI library). MATLAB/Simulink. *Historical:* Tcl/Tk, PerlTk, IDL, Visual Basic.

Signal processing, network modelling, synthesis, control, and simulation: MATLAB/Simulink, PureData (patch-based synthesis), GEM (real-time visuals for PureData), Max/MSP, Modelica, Arduino micro-controller programming (Arduino C++ IDE), JSyn audio synthesis. *Historical:* LabVIEW, Agilent/HP VEE.

Graphics and data plotting: Maple, Mathematica, MATLAB/Simulink, Visual Toolkit (VTK) for C++, Qt C++ GUI API. *Historical:* IDL, PV-WAVE, FOTO, NCAR, Gnuplot, JUNG Java network graphing.

Animation: OpenGL, PureData/GEM, MAX/MSP, X3D/VRML, Java3D, Swift3D, Maple, Mathematica, MATLAB/Simulink, ScreenFlow (Mac screencasting). *Historical:* Houdini (Side Effects).

Graphic Design: Photoshop, Illustrator, Pixelmator (Mac), GIMP, Swift3D.

Audio/Video: Final Cut for Mac (video/audio), Ableton Live (audio), ScreenFlow (Mac screencasting).

Word processing: MS Word, OpenOffice, Mac Pages. *Historical:* TEX, LATEX, Lyx.

Spreadsheets: MS Excel, OpenOffice Calc, Mac Numbers.

Operating systems and environments:

- **UNIX:** Mac OS X, Linux, iOS, Android. *Historical:* Solaris. IRIX, HP-UX, AIX, Domain-OS.
- **Microsoft:** many MS Windows variants, MS-DOS.

Window systems and desktops:

- **Mac:** Mac OS X; **Microsoft:** many MS Windows variants. **X11/Linux:** KDE. *Historical:* Gnome, fvwm.

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5) Appendix: Qualifications

5.1) NSW Higher School Certificate

Completed: 1984.

Institution: Dubbo South High School, NSW, Australia.

Result: 461/500 (top 1% of state).

Certificate subjects: Physics, Chemistry, Maths (4-unit, advanced), English (3-unit, advanced).

Non-certificate subjects: History, German, French.

5.2) Bachelor of Science (honours class I)

Period: 1985 – 1988.

Institution: University of Sydney.

Subjects: Physics, Pure and Applied Mathematics, Chemistry, Computer Science.

Honours thesis: *"An analysis of image formation in MOST"*: a computational study of rotational aperture synthesis radio astronomy.

Supervisor: Prof. L. E. Cram, School of Physics, Dept. Astrophysics.

5.3) Doctor of Philosophy: astrophysics and applied mathematics

Period: 1989 – 1993 (conferred Jan 1994).

Institution: University of Sydney, School of Mathematics and Statistics, Australia, in conjunction with the Institute for Theoretical Astrophysics, University of Heidelberg (Ruprecht-Karls-Universität), Germany.

Thesis title: *"Radiation hydrodynamics of early stages of type II supernovae"*

Research areas: astrophysics, supernovae; hydrodynamics, radiation transfer; numerical modelling, adaptive grids; partial differential equations; computer simulation and multi-dimensional visualisation; symbolic algebra.

Supervisor, Sydney, Australia: Assoc. Prof. C. J. Durrant, School of Mathematics, Uni.Syd.

Additional supervision, Heidelberg, Germany: Prof. P. Ulmschneider and Prof. R. Wehrse.

5.4) Scholarships, grants, and awards

- Australian Postgraduate Research Award (APRA) 1989 – 1993
- German Academic Exchange Service (Deutscher Akademischer Austauschdienst DAAD) 1989

5.5) Professional Certifications

- Object Management Group: OMG Certified Systems Modeling Professional (OCSMP):
  - OCSMP Model User (2010)
  - OCSMP Model Builder - Fundamental (2010)
  - OCSMP Model Builder - Intermediate (2010)

6) Appendix: Professional Memberships

- Object Management Group (OMG)
- Systems Engineering Society of Australia (SESA)
- International Council on Systems Engineering (INCOSE)
- Australian Alumni of the German Academic Exchange Service (Deutscher Akademischer Austauschdienst DAAD)