Christian Rinderknecht

Software R&D Engineer and expert in formal methods

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Sweden — French citizen

Key skills and Knowledge

- Research and Development of Software Applications
- Technical support (prospects, clients).
- Multidisciplinary engineering (SE, telecomm, electronics)
- International work experience (France, Korea, Hungary, Sweden)
- Compiler Construction and Related Toolset
- Protocol Engineering and Model-based Test Generation
- Professional Tutor and Academic Educator
- Technical Documentation and Publication
- Published author on functional programming
- Bilingual French/Spanish and Fluent English (C1 level 93%)

Employment History

2016- Wolfram | MathCore (Linköping, Sweden)
Compiler Engineer
Designing and writing (in OCaml) a new front-end for the Modelica compiler.

2015-2016 Numalis (Montpellier, France)
R&D Engineer
Development of software tools (C++, OCaml) for assessing the loss of accuracy due to the intricacy of the floating-point arithmetics, and suggesting improved calculations by means of source-to-source transformations.

2014-2015 Cortus (Montpellier, France)
Software R&D Engineer
Maintenance and development of a .NET compiler (in C♯ and OCaml) for Cortus microprocessors.

2013-2014 Eötvös Loránd University (Budapest, Hungary)
Invited Researcher (Dept. of Programming Languages and Compilers)
Design of a DSL supporting code mobility and distribution of workflows over Cyber-Physical Systems (Internet of Things). Implementation in OCaml of a compiler to Erlang. Teaching masters students at the EIT ICT Labs.

2005-2012 Konkuk University (Seoul, Republic of Korea)
Assistant Professor (Dept. of Internet and Multimedia Engineering)
Analysis of algorithms and functional programs. Compiler construction. Didactics of programming & virtual reality.

2003-04 École Supérieure d'Ingénieurs Léonard de Vinci (Courbevoie, France)
Assistant Professor (Dept. of Informatics)
Web-based framework for e-learning. Formal review design and soundness proof of ASN.1/BER.

2001-02 Information and Communications University (now KAIST, Korea)
Invited Researcher (Network Architecture Lab.)
Constraint-based analysis of ASN.1 specifications.

2000 PolySpace Tech. (now MathWorks, Montbonnot, France)
Software R&D Engineer
Development of a static analyser for JavaCard (in SML). Automatic testing, reverse-engineering and maintenance (in Perl). Case studies and sales support.

1998-00 National Institute of Telecommunications (now Télécom SudParis)
Software R&D Engineer (Software for Networking Lab.)
Technical staff on government-funded R&D projects. Specification-based test generation for telecommunication services. Development of tools for protocol testing (in OCaml).

1997-98 Alcatel-Alsthom CRC (now Alcatel-Lucent R&I, France)
Case Engineer (Object Architecture Unit)
Design of a software quality analysis for a subsidiary.

1993-98 INRIA (Project Cristal, now Gallium) & University Paris 6 (France)
Ph.D. in Informatics
Design and implementation of an analyser for ASN.1 (in OCaml). Soundness proof of the BER (encoding rules). Working group at ISO on ASN.1 (London, 1997).

Courses for undergraduates

Computer networks, information retrieval; XML languages (DTD, XPath, XSLT); programming (Erlang, OCaml, Prolog, C, C++, Pascal, Java); algebraic specifications, logic circuit design, algorithmics; software engineering, formal methods, compiler construction; Unix shell, Unix development tools; linear algebra, integral calculus.

Postgraduate teaching and Research

Courses: SDL (programming language for telecommunications); advanced functional programming; advanced programming in Java. I have been the main tutor (two years) of the thesis of a master student on blending the Programming By Example paradigm with Augmented Reality in order to teach functional programming on linear structures.

Tools and formal languages

- *Programming languages*: Java, OCaml, Erlang, C, C♯, C++, F♯, XSLT, Eiffel, Ada, Perl, Standard ML, Prolog, Pascal.
- *Documentation*: LaTeX, HTML.
- *Markup technologies*: HTML, CSS, JavaScript, XPath, DTD, XSLT.
- *Protocol engineering*: ObjectGeode, Tau (Telelogic), LOTOS, ASN.1 and related encoding rules, TTCN-3, MSC, SDL, specification-based test generation, automata theory.
- *Software engineering*: UML, test, compiler construction (in particular, parsing and type systems), static analysis, formal methods (specification, correctness).
- *System administration*: Linux (Lubuntu), OS X.
- *Databases* SQLite.
- *Development tools*: Monodevelop (a.k.a. Ximian Studio), Emacs, makefiles, autotools, shell scripts, scripting languages, versioning (CVS, Subversion, Git), scanning and parsing (sed, perl, Lex/Yacc) etc.

Free Software and Miscellanea

- I wrote the LL(1) grammar for ASN.1 used by the open source *Cryptix ASN.1 Kit* (`http://sourceforge.net/projects/cryptix-asn1`). I designed and proved correct a parser for ASN.1.
- Many shell scripts for Linux system administration, a web site generator, a pretty-printer for TeX messages, a build system for OCaml.
- Besides French, I am fluent in English and Spanish, and I taught in these languages. I translated the love poems *Veintes poemas de amor y una canción desesperada* of Pablo Neruda to French (Gallimard Poésie, Paris, 1998).
- I received a cheque from Donald Knuth for finding an error in *The Art of Computer Programming*, volume 4.

References

[1] Christian Rinderknecht. ***Design and Analysis of Purely Functional Programs***, volume 15 of *Texts in Computing*. College Publications, United Kingdom, third edition, January 2012. 650 pages.

[2] Nachum Dershowitz and Christian Rinderknecht. **The Average Height of Catalan Trees by Counting Lattice Paths**. *Mathematics Magazine*, 88(3):187–195, June 2015. 18 pages (preprint, including supplement).

[3] Christian Rinderknecht. **A Survey on Teaching and Learning Recursive Programming**. *Informatics in Education*, 13(1):87–119, April 2014.

[4] Christian Rinderknecht. *Communication Model in Distributed Cyber-Physical Systems*, chapter Model-based design and testing. Eötvös Loránd University, June 2013. 19 pages.

[5] Christian Rinderknecht. **A Didactic Analysis of Merge Sort**. *Teaching Mathematics and Computer Science*, 11(2):195–210, October 2013.

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[7] Christian Rinderknecht. **A Didactic Analysis of Functional Queues**. *Informatics in Education*, 10(1):65–72, April 2011.

[8] Juan Diego Tascón Vidarte, Christian Rinderknecht, Jee-In Kim, and HyungSeok Kim. **A Tangible Interface for Learning Recursion and Functional Programming**. In *Proceedings of the International Symposium on Ubiquitous Virtual Reality*, Gwangju, Republic of Korea, July 2010.

[9] Christian Rinderknecht and Nic Volanschi. **Theory and Practice of Unparsed Patterns for Metacompilation**. *Science of Computer Programming*, 75(3):85–105, March 2010.

[10] Nic Volanschi and Christian Rinderknecht. **Unparsed Patterns: Easy User-extensibility of Program Manipulation Tools**. In *Proceedings of the ACM SIGPLAN Symposium on Partial Evaluation and Semantics-based Program Manipulation (PEPM)*, pages 111–121, San Francisco, USA, January 2008.

[11] Christian Rinderknecht. **Matching Pairwise Divergent Paths in XML Streams**. *Journal of Industrial Science and Technology*, 32:57–75, December 2007.

[12] Patrick Duval, Agathe Merceron, Christian Rinderknecht, and Michel Scholl. **LeVinQam: A Question Answering Mining Platform**. In *Proceedings of the Fifth International Conference on Information Technology-based Higher Education and Training (ITHET)*, Istanbul, Turkey, June 2004.

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[16] Ana Cavalli, Bruno Defude, Christian Rinderknecht, and Fatiha Zaïdi. **A Service-component Testing Method and a suitable CORBA Architecture**. In *Proceedings of the Sixth IEEE Symposium on Computers and Communications (ISCC)*, pages 655–666, Hammamet, Tunisia, July 2001.

[17] Ana Cavalli, Bruno Defude, Christian Rinderknecht, and Fatiha Zaïdi. **Test de composants de service et exécution de tests sur une plate-forme CORBA**. In *Actes de la Conférence Francophone en Ingénierie des Protocoles*, pages 363–378, Toulouse, France, October 2000. Hermes.

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Engineering and Distributed Systems (FORTE), pages 41–56, Beijing, China, October 1999.

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