Curriculum Vitae

Stefano Zacchiroli
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1 Personal Data

Name Stefano Zacchiroli

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GnuPG Public Key Fingerprint(s):

- 8156 FBF9 3EC1 D872 722D 3632 D5CA 9B04 F2C4 23BC

2 Education

Jan 2004–Dec 2006 I have been a Ph.D. student at the Department of Computer Science, University of Bologna. My Ph.D. advisor has been Professor Andrea Asperti.

My Ph.D. thesis, titled "User Interaction Widgets for Interactive Theorem Proving" has been defended successfully in April 2007.

Feb–Maj 2006 I have been a visiting researcher at the Computer Science Department of the Brown University, Providence, RI. There, I have been working on (wiki-like) collaborative technologies for the authoring of constrained documents. My advisor there has been Professor David G. Durand.

May–Dec 2003 I have been a visiting researcher at the Laboratoire d'Informatique de l'École Normale Supérieure, Paris. During that period I have been working as a member of the CDuce team on the development of the CDuce programming language.

Mar 2003 I have got a Master Degree in computer science with a rating of 110/110 *cum laude* at the Department of Computer Science, University of Bologna.

My master thesis has been titled "Web Services per il supporto alla dimostrazione interattiva" (Web Services for Interactive Theorem Proving).

1997–2002 I have been an undergraduate Students of Computer Science, with specialization in Distributed Systems, of the faculty of Mathematical, Physical and Natural Science of the University of Bologna.

During these five years I have been interested in distributed systems, operating systems design and implementation, theoretical computer science, formal logic and proof theory, software engineering, and functional programming.

During the last four years of attendance I have also been a volunteer system administrator of a (Debian) GNU/Linux network cluster (about 30 hosts).

Jul 1997 I have got a diploma in Electronics and Telecommunications with a rating of 60/60 at the ITIS Ettore Majorana, Budrio (Bologna).

3 Research Interests

Open Source Infrastructure in particular:

- the application of formal methods and automatic theorem proving for the solution of real-life constraints induced by the interaction of software components in GNU/Linux distributions

Markup Languages in particular:

- schema languages and rich type systems for XML documents with and without overlapping problems;
- efficient processing and representation of XML documents especially with respect to parsing, validation, un-marshalling, and transformation;

Mathematical Knowledge Management in particular:

- encoding of mathematical proofs and formulae in machine understandable formats suitable for proof checking, rendering, semantic searches, . . . ;
- large scale libraries of formalized mathematics;

Interactive Theorem Proving and Proof Assistants in particular:

- proof assistant usability and human computer interaction;
- interaction among libraries of formalized mathematics and tools for formal proof authoring (proof assistants and automatic theorem provers).

4 Current Work

Mancoosi I'm a member of the MANCOOSI (MANagement the COmplexity of the Open Source Infrastrcture), an European Union funded project for the application of formal methods to the solution of complexity issues in the management of GNU/Linux distributions.

In the context of Mancoosi, I'm currently working as a post-doc researcher at the PPS Laboratoire of Université Paris Diderot—Paris 7.

Debian I'm an official developer of the Debian GNU/Linux operating system since 2001. My activities in Debian are mainly about the following topics:

- maintenance of packages related to the Objective Caml (OCaml) programming language (I'm maintaining a substantial part of the whole OCaml-related Debian packages, one of the founder of the Debian OCaml Maintainers Task Force, co-editor of the Debian OCaml policy, and author of several tools for maintaining the consistency among OCaml-related packages)

- maintenance of packages related to the Vim editor (I'm co-maintaining the editor itself and several addon packages, beside working on the infrastructure for managing Vim addons on target systems)
- QA work (in recent times I have started working on infrastructure tools for the Debian QA team, most notably contributing to the Package Tracking System and its web front-end)

5 Past Work

TWEBBO I've been a member of the web technologies research group of the Department of Computer Science, University of Bologna; the group is led by Professor Fabio Vitali.

There I've worked on overlapping markup, and constraint enforcement in web-based collaboration. I'm also still a member from the University of Bologna of the XML Schema Working Group of the World Wide Web Consortium (W3C).

HELM I've been a member of the HELM project, University of Bologna.

The HELM project is a long term project of the University of Bologna, aimed to the integration of the current tools for the automation of formal reasoning and the mechanization of mathematics (proof assistants and logical frameworks) with the most recent technologies for the development of web applications and electronic publishing, eventually passing through the Extensible Markup Language. The final aim is the development of a suitable technology for the creation and maintenance of a virtual, distributed, hypertextual library of formal mathematical knowledge.

I'm still one of the developer of Matita, an experimental, interactive theorem proving based on the Calculus of (Co)Inductive Constructions, compatible at some extent with Coq and integrated with HELM distributed library.

CDuce I have been been a member of the CDuce team, where I have worked on the development of the CDuce programming language.

CDuce is a general purpose functional programming language, adapted to the manipulation of XML documents. The peculiar features of CDuce include: XML objects and functions as first class values, powerful pattern matching operations, rich type algebra (including recursive types and arbitrary boolean combinations of types), UTF-8 support, polymorphism (using a natural notion of sub-typing and overloaded functions with dynamic dispatch on types), highly-effective type-driven compilation schema.

I wrote the first implementation of CDuce support for XML Schema.

MoWGLI I have been a member of the (now completed) MoWGLI project.

MoWGLI was an European Union funded, IST project aimed at enriching web available mathematical knowledge with semantic information in order to pass from machine-readable to machine-understandable mathematical knowledge on the web.

6 Papers

6.1 Journal Articles

1. *Towards the unification of formats for overlapping markup* with Paolo Marinelli, Fabio Vitali. In New Review of Hypermedia and Multimedia, Volume 14, Issue 1, January 2008, pp. 57-94. Taylor and Francis, ISSN 1361-4568. DOI 10.1080/13614560802316145.

2. *Spurious Disambiguation Errors and How to Get Rid of Them* with Claudio Sacerdoti Coen. In Mathematics in Computer Science, Volume 2, Number 2, pp. 355-378, December 2008. Special Issue on Management of Mathematical Knowledge, Springer Birkhäuser, ISSN 1661-8270. DOI 10.1007/s11786-008-0058-2.

3. *User Interaction with the Matita Proof Assistant* with Andrea Asperti, Claudio Sacerdoti Coen, Enrico Tassi. In Journal of Automated Reasoning, Volume 39, Number 2, Special Issue on User Interfaces for Theorem Proving, Springer Netherlands, ISSN 0168-7433, pp. 109-139, 2007. DOI 10.1007/s10817-007-9070-5.

6.2 Book Chapters

1. *Web Semantics via Wiki Templating* with Angelo Di Iorio, Fabio Vitali. Chapter 34 of Handbook of research on Web 2.0, 3.0 and x.0: technologies, business and social applications. IGI Publishing, May 2009, ISBN 978-1-60566-384-5.

6.3 Conference Proceedings

1. *Expressing Advanced User preferences in Component Installation* with Ralf Treinen. To appear in proceedings of IWOCE 2009 International Workshop on Open Component Ecosystem, affiliated with ESEC/FSE 2009. August 24, 2009 - Amsterdam, The Netherlands.

2. *Towards maintainer script modernization in FOSS distributions* with Davide Di Ruscio, Patrizio Pelliccione, Alfonso Pierantonio. To appear in proceedings of IWOCE 2009 International Workshop on Open Component Ecosystem, affiliated with ESEC/FSE 2009. August 24, 2009 - Amsterdam, The Netherlands.

3. *Strong Dependencies between Software Components* with Pietro Abate, Jaap Boender, Roberto Di Cosmo. To appear in proceedings of ESEM 2009 (3rd International Symposium on Empirical Software Engineering and Measurement). October 15-16, 2009 - Lake Buena Vista, Florida, USA.

4. *Towards a Model Driven Approach to Upgrade Complex Software Systems* with Antonio Cicchetti, Davide Di Ruscio, Patrizio Pelliccione, Alfonso Pierantonio. In proceedings of ENASE 2009 (4th international conference on Evaluation of Novel Aspects to Software Engineering); held in conjunction with ICEIS 2009. 6-10 May 2009, Milan, Italy.

5. *Where are your Manners? Sharing Best Community Practices in the Web 2.0* with Angelo Di Iorio, Davide Rossi, Fabio Vitali. In proceedings of ACM SAC 2009 (the 24th Annual ACM Symposium on Applied Computing). ISBN 978-1-60558-166-8, pp. 681-687DOI 10.1145/1529282.1529422.

6. *Package Upgrades in FOSS Distributions: Details and Challenges* with Roberto Di Cosmo, Paulo Trezentos. In proceedings of HotSWUp'08 (Hot Topics in Software Upgrades). October 20, 2008, Nashville, Tennessee, USA. ACM ISBN 978-1-60558-304-4.DOI 10.1145/1490283.1490292.

7. *Wiki Content Templating* with Angelo Di Iorio, Fabio Vitali. In Proceedings of WWW 2008: 17th International World Wide Web Conference. April 21-25, 2008 Beijing, China. ACM 978-1-60558-085-2/08/04, pp. 615-624. DOI 10.1145/1367497.1367581.

8. *Streaming Validation of Schemata: the Lazy Typing Discipline* with Paolo Marinelli, Fabio Vitali. In Proceedings of Extreme Markup Languages 2007: The Markup Theory and Practice Conference. August 7-10, 2007 Montreal, Canada.

9. *Spurious Disambiguation Error Detection* with Claudio Sacerdoti Coen. In Proceedings of MKM 2007: The 6th International Conference on Mathematical Knowledge Management. Hagenberg, Austria – 27-30 June 2007. LNAI 4573, Springer Berlin / Heidelberg, ISBN 978-3-540-73083-5, pp. 381-392, 2007. DOI 10.1007/978-3-540-73086-6_30.

10. *Co-Constraint Validation in a Streaming Context* with Paolo Marinelli. In Proceedings of XML 2006, "The world's oldest and biggest XML conference". Award: Winner of the XML Scholarship 2006 as best student paper. Boston, MA – December 5-7, 2006.

11. *Crafting a Proof Assistant* with Andrea Asperti, Claudio Sacerdoti Coen, Enrico Tassi. In Proceedings of Types 2006: Types for Proofs and Programs. Nottingham, UK – April 18-21, 2006. LNCS 4502, Springer Berlin / Heidelberg, ISBN 978-3-540-74463-4, pp. 18-32, 2007. DOI `10.1007/978-3-540-74464-1_2`.

12. *Tinycals: Step by Step Tacticals* with Claudio Sacerdoti Coen, Enrico Tassi. In Proceedings of UITP 2006: User Interfaces for Theorem Provers. Seattle, WA – August 21, 2006. ENTCS (Elsevier, ISSN 1571-0661), Volume 174, Issue 2, pp. 125-142 (15 May 2007). DOI `10.1016/j.entcs.2006.09.026`.

13. *Constrained Wiki: an Oxymoron?* with Angelo Di Iorio. In Proceedings of WikiSym 2006: the 2006 International Symposium on Wikis. Odense, Denmark – August 21-23, 2006. ACM Press, 2006, ISBN 1-59593-417-0, pp. 89-98. DOI `10.1145/1149453.1149471`.

14. *From Notation to Semantics: There and Back Again* with Luca Padovani. In Proceedings of MKM 2006: The 5th International Conference on Mathematical Knowledge Management. Wokingham, UK – August 11-12, 2006. LNAI 4108, Springer Berlin / Heidelberg, ISBN 978-3-540-37104-5, pp. 194-207, 2006. DOI `10.1007/11812289_16`.

15. *A Content Based Mathematical Search Engine: Whelp* with Andrea Asperti, Ferruccio Guidi, Claudio Sacerdoti Coen, Enrico Tassi. In Proceedings of TYPES 2004 conference: Types for Proofs and Programs. Paris, France – December 15-18, 2004. LNCS 3839, Springer Berlin / Heidelberg, ISBN 3-540-31428-8, pp. 17-32, 2006. DOI `10.1007/11617990_2`.

16. *A Generative Approach to the Implementation of Language Bindings for the Document Object Model* with Luca Padovani, Claudio Sacerdoti Coen. In Proceedings of GPCE'04 Third International Conference on Generative Programming and Component Engineering. Vancouver, Canada – October 24-28, 2004 LNCS 3286, Springer Berlin / Heidelberg, ISBN 3-540-23580-9, pp. 469-487, 2004. DOI `10.1007/b101929`.

17. *Searching Mathematics on the Web: State of the Art and Future Developments* with Andrea Asperti. In Proceedings of New Developments in Electronic Publishing AMS/SMM Special Session, Houston, May 2004 ECM4 Satellite Conference, Stockholm, June 2004 p. 9-18. FIZ Karlsruhe, ISBN 3-88127-107-4.

18. *Efficient Ambiguous Parsing of Mathematical Formulae* with Claudio Sacerdoti Coen. In Proceedings of MKM 2004 Third International Conference on Mathematical Knowledge Management. September 19-21, 2004 Bialowieza - Poland. LNCS 3119, Springer Berlin / Heidelberg, ISBN 3-540-23029-7, pp. 347-362, 2004.

19. *Brokers and Web-Services for Automatic Deduction: a Case Study* with Claudio Sacerdoti Coen. In Proceedings of Calculemus 2003 11th Symposium on the Integration of Symbolic Computation and Mechanized Reasoning. Roma, Italy – September 10-12, 2003, Aracne Editrice S.R.L. ISBN 88-7999-545-6, pp. 43-57, 2003.

6.4 Technical Reports

1. *Strong Dependencies between Software Components* with Pietro Abate, Jaap Boender, Roberto Di Cosmo. Mancoosi project technical report 0002, 22/05/2009.

2. *Metamodel for Describing System Structure and State* with Davide Di Ruscio, Patrizio Pelliccione, Alfonso Pierantonio. Mancoosi project deliverable, D2.1, work package 2. January 2009.

3. *Description of the CUDF Format* with Ralf Treinen. Mancoosi project deliverable, D5.1, work package 5. November 2008.

4. *Stream Processing of XML Documents Made Easy with LALR(1) Parser Generators* with Luca Padovani. Technical report UBLCS-2007-23, September 2007, Department of Computer Science, University of Bologna.

5. *Templating Wiki Content for Fun and Profit* with Angelo Di Iorio, Fabio Vitali. Technical report UBLCS-2007-21, August 2007, Department of Computer Science, University of Bologna.

6.5   Dissertations

1. *User Interaction Widgets for Interactive Theorem Proving* with . Ph.D. dissertation, Technical report UBLCS-2007-10, March 2007, Department of Computer Science, University of Bologna (advisor: Andrea Asperti; refereed by: Christoph Benzmueller, Marino Miculan).

2. *Web services per il supporto alla dimostrazione interattiva (Web services for interactive theorem proving)* with . Master thesis (Italian only), March 2003, Department of Computer Science, University of Bologna (advisor: Andrea Asperti; refereed by: Nadia Busi).

7   Software

Most relevant software of which I have been (co-)author so far:

2006–2008 Matita—The Matita proof assistant

2006-2008 LablGtkSourceView—OCaml bindings for LablGtkSourceView, a GTK+ source editor

2002-2008 LablGtkMathView—OCaml bindings for GtkMathView, a rendering engine for MathML documents

2002–2008 OCaml HTTP—an Objective Caml library used to easily write HTTP daemons in both functional and imperative programming style

2002–2006 UWOBO—a Web-Service-based XSLT processor, supporting not only the usual single-stylesheet application, but also applications of *stylesheets chains*

2002–2006 GDome2-XSLT—a binding to libxslt providing XSLT functionalities on GDome2 documents. C implementation, Objective Caml bindings also available

2002 talKZ—a *ntalk* implementation (both client and server) with support for logging and TLS

2003 CDuce—CDuce is a general purpose functional programming language, adapted to the manipulation of XML documents. The peculiar features of CDuce include: XML objects, 1st class citizen functions, pattern matching, rich type algebra, UTF-8 support, polymorphism, highly-effective type-driven compilation schema. He implemented and used to maintain XML Schema support in CDuce.

2001–2007 Debian packages I took care of the packaging and I'm still actually (co-)maintaining for the Debian GNU/Linux operating system:

OCaml related packages: calendar (OCaml library providing operations over dates and times), cameleon (an integrated development environment for OCaml), camlidl (stub code generator for OCaml), camlimages (OCaml image processing library), cryptgps (OCaml library for symmetric cryptographic algorithms), cryptokit (cryptographic algorithm library for OCaml), extlib (extended standard library for OCaml), findlib (management tool for OCaml libraries), lablgtkmathview (OCaml bindings for gtkmathview), lablgtksourceview (OCaml bindings for gtksourceview), mlglade (Glade to OCaml compiler), mlgmp (OCaml bindings for the GNU multiprecision arithmetic library), netclient (OCaml HTTP/1.1 and Telnet client library), numerix (big integer library for OCaml), ocaml-http (OCaml library for writing HTTP daemons), ocaml-tools (tools for OCaml programmers), ocamlnet (OCaml application level Internet protocols libraries), ocaml-web (literate programming tool for OCaml), pcre-ocaml (OCaml bindings for the PCRE regexp library), postgresql-ocaml (OCaml bindings to PostgreSQL's libpq), pxp (OCaml library implementing an XML-1.0 validating parser), tuareg-mode (emacs-mode for OCaml programs), ulex (OCaml lexer generator with Unicode support), xstr (OCaml library for frequent string operations)

Vim-related packages: vim (Vi IMproved - enhanced vi editor), vim-scripts (collection of Vim addons), vim-latexsuite (thorough support for LaTeX inside Vim), vim-addon-manager (command line manager of Vim addons)

XML related packages: cduce (programming language adapted to the manipulation of XML data), editex (MathML editor based on TeX syntax), gdome2-xslt (minimal XSLT processor working on GDome2 documents), gmetadom (a collection of DOM implementations), gtkmathview (C++ rendering engine for MathML documents)

Other packages: advi (an active DVI previewer and presenter), approx (caching proxy server for Debian archive files), bibtex2html (BibTeX filte to HTML), coq (proof assistant for higher-order logic), hevea (LaTeX to HTML translator)

8 Program Committees

Conferences in which I was a member of the program committee:

- ACM SAC 2010 (the 25th Annual ACM Symposium on Applied Computing), Web Technology track

9 Attended Schools and Conferences

Academic schools and conferences I've attended:

May 2009 Co-authored a paper for ENASE 2009: 4th International Conference on Evaluation of Novel Aspects to Software Engineering. 9-10 May 2009, Milan, Italy.

March 2008 Co-authored a paper for ACM SAC 2009: the 24th Annual ACM Symposium on Applied Computing. Waikiki Beach, Honolulu, Hawaii, USA. Monday March 9 - Thursday March 12, 2009.

October 2008 Co-authored a paper for and participated at HotSWUp'08 (Hot Topics in Software Upgrades). October 20, 2008, Nashville, Tennessee, USA.

April 2008 Co-authored a paper for and participated at WWW 2008: 17th International World Wide Web Conference. April 21-25, 2008 Beijing, China.

August 2007 Co-authored a paper for and participated at Extreme Markup Languages 2007: The Markup Theory and Practice Conference

June 2007 Co-authored a paper for MKM 2007: The 6th International Conference on Mathematical Knowledge Management

December 2006 Co-authored a paper for XML 2006: the world's oldest and biggest XML conference

August 2006 Co-authored a paper for UITP 2006: User Interfaces for Theorem Provers

August 2006 Co-authored a paper for WikiSym 2006: the 2006 International Symposium on Wikis

August 2006 Co-authored a paper for and participated at MKM 2006: The 5th International Conference on Mathematical Knowledge Management

August 2005 Participated at TYPES Summer School 2005: Proofs of Programs and Formalisation of Mathematics

April 2006 Co-authored a paper for Types 2006: Conference of the Types Project

Mar 2005 Gave a talk about HELM at workshop on "Logica, visione, e computazione" (logics, visios, and computation), Bologna, Italy.

Dec 2004 Co-authored a paper for and participated at TYPES 2004 conference, Paris, France.

Jul 2004 Participated at Lipari School 2004, 16th International School for Computer Science Researchers, Lipari Island, Italy.

Jun 2004 Gave a talk at Workshop on New Developments in Electronics Publishing of Mathematics, Stockholm, Sweden.

Mar 2004 Participated at BISS 2004: Bertinoro International Spring School for Graduate Studies in Computer Science.

Sep 2003 Gave a talk at Calculemus 2003 (11th Symposium on the Integration of Symbolic Computation and Mechanized Reasoning) conferences in Rome, Italy.

Feb 2003 Participated at the MKM 2003 (Mathematical Knowledge Management) conference, Bertinoro, Italy.

10 Teaching Experiences

I have been a lecturer or teaching assistants of several courses of the University of Bologna (and affiliated schools):

2007/2008 Teacher of Logica Matematica (Mathematical Logics), Laurea Degree in Applied Computer Science, University of Urbino.

2006–2008 (2 Academic years) Teaching assistant of Logica Matematica (Mathematical Logics), 2nd undergraduate year of Computer Science, University of Bologna.

2006/2007 Lecturer of Laboratorio di Sistemi Informativi (Data Bases andInformative System Laboratory) at Master in Tecnologia del Software Libero e Open Source (1st level master on Free Software and Open Source Technologies), Alma Graduate School, University of Bologna.

2005–2007 (3 Academic years) Teaching assistant of Programmazione (Programming), 1st undergraduate year of Computer Science (language taught: Java), University of Bologna.

2004–2007 (3 Academic years) Lecturer of Laboratorio di Sistemi Operativi (Operating System Laboratory) at Master in Tecnologia del Software Libero e Open Source (1st level master on Free Software and Open Source Technologies), Alma Graduate School, University of Bologna.

2004/2005 Teaching assistant of Programmazione (Programming), 1st undergraduate year of Computer Science (language taught: Scheme), University of Bologna.

2003/2004 Teaching assistant of Programmazione (Programming), 1st undergraduate year of Computer Science (language taught: Java), University of Bologna.

11 Job Experiences

- 4 year experience as GNU/Linux system administrator in the *Underlab* (the Computer Science Department laboratory for undergraduate students at University of Bologna, Italy)

- 1 year experience as GNU/Linux system administrator for 3D automazione

- 3 year experience as computer science teacher for children on the behalf of the DIRe Project

- 1 year experience as OCaml consultant for BioMedin

- 1 year experience as PHP developer for PapiroNet

- 1 year teaching experience of GNU/Linux system administration for an IFTS course for COFIMP

12 Miscellanea

2008 Consultant for the publishing house Il Mulino for the typesetting of books authored with the LaTeX type setting engine

2002–2008 Founder and member of Bononia.it, Italian non-profit organization for promoting free and open-source software philosophy

2007–2008 Consultant for Comune di Bologna for the migration of the information technology infrastructure of the city of Bologna to free and open-source technologies