

Curriculum Vitae

MARCO BRAMBILLA

Family name: Brambilla

First name: Marco

Organisation: Politecnico di Milano

Current Position and Department:

Ricercatore confermato (Assistant Professor)

Dipartimento di Elettronica e Informazione (DEI)

Address: Via Ponzio, 34/5
20133 Milano, Italy

Phone: +39 02 2399 7621

Fax: +39 02 2399 7321

Mobile phone: +39 3290027365

e-mail address: marco.brambilla@polimi.it

Date of first PhD or Doctorate award: October 2004

Curriculum vitae (maximum 3 pages, make reference to list of publications if necessary):

Marco Brambilla is assistant professor at Politecnico di Milano since February 2004. He graduated cum laude in 2001 and got his Ph.D. in Information Engineering at Politecnico di Milano with final mark "A-Excellent". He collaborated as application analyst in several industrial projects; among others, he worked with Acer Europe, Cisco System (San José, CA), and WebRatio. He has a wide teaching experience in Databases, Computer Science and Web Engineering., and actively participated to the WebSI (Web Services Integrator) research project, founded by the European Union in the fifth framework.

In 2004, he spent 6 months as visiting researcher at UCSD (University of California, San Diego). He collaborated with Yannis Papakonstantinou, Victor Vianu, and Alin Deutsch, working on Web application models and on Specification and verification of workflow-based Web applications through linear temporal logics.

Several seminars on conceptual modeling, Web services, workflow and Web engineering has been given at Harvard University Medical School (Boston, USA), CISCO System (San José, USA), University of California, San Diego (UCSD, USA), Stanford University (Palo Alto, USA), and Politecnico di Milano (Italy), and EDBT 2002 Ph.D. summer school in Cargese (FR).

He participated in several European and national research projects. The main ones are listed below:

- 2008: Pharos EU Project: The project aims to design and implement a framework of federated search engines for audiovisual content.
- 2005: Cooper EU Project: The purpose of the project was the development of an architecture and a methodology for the implementation of collaborative Web applications.
- 2005: ESA MyHMI Project: The purpose of the project was the creation of software architectures based on Internet technologies for embedded devices such as handhelds, low performance

platforms with touchscreen displays, and so on. The project is being developed in collaboration with the ESA Elettronica SpA.

- 2002: WebSI EU Project: The purpose of the project was the development of an architecture and a modeling language for the integration of Web applications through orchestration of Web services, specified through business process models.
- 2002: MetalC Project: The purpose of the project was the creation of an Internet platform for exchanging digital information within and between SME enterprises by allowing the integration of with customers and suppliers.
- 2000: Project EU Esprit W3I3: The purpose of the project was the development of a visual modeling language for the specification and design of dynamic Web applications (WebML).

Research Interests:

His research interests include theoretical, experimental and methodological aspects related to Web modeling methodologies, Web design patterns, conceptual design of data-intensive Web applications, workflow-based Web applications, service oriented applications, Semantic Web application modeling, MDD/MDA, Web architectures for embedded and HMI systems interfaced with home automation and industrial automation, simplified interfaces for disabled people. A brief description of the research activities is detailed below:

1. Models and methods for designing Web applications

At the Politecnico di Milano, he has dealt with the definition of a method for developing data-intensive Web applications. This method is based on the conceptual model WebML and a suite of software tools that support developers in the design and development of Web applications. Marco Brambilla contributed to the project by studying the user interaction primitives and methodological issues related to the development process of applications [1], [16], [9].

2. Specification of Web applications based on workflow

This aspect, addressed within the European project WebSI, focused on the definition of a formal methodology for development of Web applications based on business processes, typically specified by workflow models. Based on consolidated results in the area of traditional information systems, the research extended the WebML formalism with new models for the representation of workflow specification for the Web, which allow the modeling of applications based on business processes. The research also studied the problems of implementation of these primitives and developed a prototype for modeling and automatic generation of these applications, also addressing the management of exceptions and failures peculiar to the Internet platform. In order to check any deficiencies in the expressive power of primitive studied, the research has included the implementation of some real applications (e.g., project MetalC) [3], [6], [7], [10], [24], [27], [28].

3. Specification of Web services and integration with traditional Web applications

The third research line addressed by the candidate is the modeling of interactions between Web applications through Web services. The study led to the definition of a set of WebML primitives for the invocation of remote services and for the publishing services to be exposed to third parties. The activity has included the development of software tools to support the proposed model [4], [5] [25], [29], [33].

4. Formal verification of properties of Internet application through linear-time temporal logic

The research work on this topic has started at University of California, San Diego during the 2004 visit and is continuing within some master student thesis works and the collaboration with UCSD. The work currently includes the study of the expressive power of WebML and the comparison with other models for formal specification for Web applications, with particular attention to the Wave model, defined by the research team of UCSD in order to implement formal verification tools of the properties. The current work includes the formalization of meta-models (according to MDA / MOF) of WebML and Wave, and the study of the transformation between the two models, in order to develop a process for developing Web applications that exploit the advantages of both approaches. The proposal is being implemented through a series of prototypes [26].

5. *Study of new models and interfaces for deploying Web applications*

This research, carried out in collaboration with University of California, San Diego, aims at defining appropriate abstractions for programming Web applications structured according to the MVC architecture-2 (or Model 2). The goal is to provide a uniform programming for access to all types of available data sources, by means of a conceptual model for the visual description of MVC controller architectures. Online CASE tool are under development [31].

6. *Design of Internet architectures for HMI and embedded systems*

This research project, managed and coordinated by Marco Brambilla, was conducted in collaboration with the company ESA Elettronica SpA consist in the analysis, design, and prototyping of a new generation of HMI (Human Machine Interface) applications for industrial automation, building automation, and home automation. These applications are characterized by remotization, multichannel access, mobility, personalization and adaptivity to the context. The value added of the industrial innovation is the introduction of architectures based on Internet technology within the HMI field [20], [21].

7. *Modeling of Semantic Web Applications*

The research in this area has been launched recently as natural evolution and extension of the study of patterns of Web services and Web applications. The activity consists in the study of a variant of the model WebML for Web applications, proposing an extension in order to represent data sources and primitives for managing and querying ontological data sources. In particular, the work addresses the definition of a relational metamodel of WSMO, of a set of WebML primitives, and of a design methodology for developing semantic web applications, with particular attention to the definition of mediators between semantic web services. This activity achieved the IBM Faculty Award and is published in [2], [8], [11], [13], [15], [18], [19], [22], [34], [35].

8. *MDA modeling of workflow constraints and transformations between models*

This research, conducted in collaboration with a research group of the Open University of Catalunya, Barcelona, consists in the translation of workflow models in conceptual models according to MDA , considering the domain model and the constraints on data integrity [17], [23], [32], [36].

9. *Study of advanced interfaces for Web applications*

This activity consists in the study of modern interfaces for rich user interaction on the Web (AJAX, Laszlo, Flash, etc.) and in developing design abstractions appropriate for this class of applications. A set of development tools is under development too, in collaboration with researchers at the University of Italian Switzerland and at University of Extremadura [12], [30].

Participation to journal and conference activities:

Marco Brambilla has been involved in the organization of the following conferences:

- ICWE (International Conference on Web Engineering) 2007: organization chair
 - ASMEA (Int. W. on Adaptive and Self-Managing Enterprise Apps.) 2005: publication chair.
- He is **reviewer** for DKE Journal on Data and Knowledge Engineering Journal (Elsevier Science) since 2003 and of the following other journals: ACM Transactions on the Web (2008), ACM Internet Computing (2008), IET Software (2007), IEEE Transactions on Software Engineering (2007), Elsevier SCP (2006), Journal of Web Engineering (2006-2008)

He is in the **Program Committee** of the following conferences: SAC 2009 (ACM Symposium on Applied Computing, Web Technologies Track), SWSC 2008 (Workshop on Evaluation of Ontology-based tools and Semantic Web Service Challenge 2008 @ ISWC) , WWW 2008 (World Wide Web Conference), ICWE 2008 (International Conference on Web Engineering), SLE 2008 (Conference on Software Languages Engineering), AEWSE 2008 (International Workshop on Adaptation and Evolution in Web Systems Engineering), SeMMA 2008 (International Workshop on Semantic Metadata Management and Applications), IEEE CEC/EEE 2007 (Conference on E-Commerce Technology and Enterprise Computing, E-Commerce and E-Services), ICWE 2007 (International Conference on Web Engineering), VORTE 2007 (International Workshop on

Vocabularies, Ontologies, and Rules for the Enterprise), ICSOC 2005 (International Conference on Service Oriented Computing), SEBD 2005 (Italian Symposium on Advanced Database Systems), IEEE EEE/CEC 2006 (Conference on E-Commerce Technology and Enterprise Computing, E-Commerce and E-Services), VLDB 2006 PhD Symposium (Very Large Databases).

He has been **external referee** for the following conferences: MED 2008 (16th Med.Conference on Control and Automation), VLDB 2008 (Very Large Databases), ICWS 2007 (International Conference on Web Services), IEEE ICDCS 2007 (Int.l Conference on Distributed Computing Systems), WISE 2006 (Web Information Systems Engineering), VLDB 2006 (Very Large Databases), ER 2006 (ER-Conceptual Modeling), Sigmod 2006 (ACM Conference of Special Interest Group on Management Of Data), WMR 2006 (International Workshop on. Web Maintenance and Reengineering), IEEE SCC 2005 (International Conference on Services Computing), SAC 2005 (IEEE Symposium on Applied Computing), XMLsymposium 2004, and others.

List of selected publications:

Books:

- [1] S. Ceri, P. Fraternali, A. Bongio, M. Brambilla, S. Comai, M. Matera. "Designing Data-Intensive Web Applications". Morgan Kaufmann Publisher, Dicembre 2002, ISBN 1-55860-843-5.

Journals:

- [2] M. Brambilla, I. Celino, S. Ceri, D. Cerizza, E. Della Valle, F. M. Facca. "Model-Driven Design and Development of Semantic Web Service Applications", ACM Transactions on Internet Technology (ACM TOIT), volume 8, number 1, November 2007, ISSN:1533-5399.
- [3] M. Brambilla, S. Ceri, P. Fraternali, I. Manolescu. "Process Modeling in Web Applications", ACM Transactions on Software Engineering and Methodology (ACM TOSEM), 2006. volume 15, number 4, October 2006, pp. 360-409, ISSN: 1049-331X.
- [4] Manolescu, M. Brambilla, S. Ceri, S. Comai, P. Fraternali. "Model-Driven Design and Deployment of Service-Enabled Web Applications", ACM Transactions on Internet Technology (ACM TOIT), volume 5, numero 3, August 2005, pp. 439-479, ISSN:1533-5399.
- [5] M. Brambilla, S. Ceri, S. Comai, P. Fraternali. "A CASE tool for modelling and automatically generating web service-enabled applications", International Journal of Web Engineering and Technology (IJWET). Volume 2, Number 4, pp. 354 - 372, 2006.
- [6] M. Brambilla, C. Tziviskou. "Fundamentals Of Exception Handling Within Workflow-Based Web Applications", Journal of Web Engineering (JWE), Rinton Press, 4 (1), Marzo 2005, pp. 38-56.
- [7] M. Brambilla, S. Ceri, S. Comai, P. Fraternali, I. Manolescu. "Specification and design of workflow-driven hypertexts", Journal of Web Engineering (JWE), Rinton Press, 1(2), Aprile, 2003, pp. 163-182.
- [8] M. Brambilla, S. Ceri, I. Celino, D. Cerizza, E. Della Valle, F.M. Facca, A. Turati, C. Tziviskou. "Experiences in the Design of Semantic Services using Web Engineering Methods and Tools". Springer LNCS Journal on Data Semantics, Volume XI, 2008, in print.

Book Chapters:

- [9] M. Brambilla, S. Comai, P. Fraternali, M. Matera. "Designing Web Applications with WebML and WebRatio". In: G. Rossi, O. Pastor, D. Schwabe, L. Olsina (Eds.). Web Engineering: Modelling and Implementing Web Applications (Human-Computer Interaction Series). Springer, October 2007, ISBN: 978-1846289224.
- [10] M. Brambilla, S. Comai, C. Tziviskou. "Exception Management within Web Applications Implementing Business Processes". In: Advanced Topics in Exception Handling Techniques. C. Dony, J.L. Knudsen, A. Romanovsky, A. Tripathi (eds.), Springer Verlag Lecture Notes In Computer Sciences, LNCS, Vol. 4119, pp. 101-120, 2006.

- [11] M. Brambilla, F. M. Facca. "Building Semantic Web Portals with a Model-Driven Design Approach". In: J. Cardoso, M. D. Lytras (Eds.), *Semantic Web Engineering in the Knowledge Society*, IGI Publishing: Hershey, PA, USA. Chapter IV, pages 76-106.
- [12] M. Brambilla, P. Fraternali, E. Molteni. "A Tool for Model-driven Design of Rich Internet Applications". In: S. Murugesan (Ed.), *Handbook of Research on Web 2.0, 3.0 and X.0: Technologies, Business, and Social Applications*. Chapter 31, in print.
- [13] M. Brambilla, S. Ceri, E. Della Valle, F.M. Facca, C. Tziviskou. "A Software Engineering Approach based on WebML and BPMN to the Mediation Scenario of the SWS Challenge". In: Petrie, C.; Lausen, H.; Zaremba, M.; Margaria, T. (Eds.), *Semantic Web Services Challenge - Results from the First Year*, Springer, in print.

Edited books:

- [14] M. Brambilla, E. Mendes. "7th International Conference on Web Engineering. Workshop Proceedings", ISBN: 978-88-902405-2-2, July 2007, Italy.

Conference papers:

- [15] M. Brambilla, C. Tziviskou. "Modeling Ontology-Driven Personalization of Web Contents". ICWE 2008, Int.l Conf. on Web Engineering, IEEE Press, July 2008, Yorktown Heights, USA, pp. 247-260.
- [16] R. Acerbis, A. Bongio, M. Brambilla, S. Butti, S. Ceri, and P. Fraternali. "Web applications design and development with WebML and WebRatio 5.0". 46th TOOLS Europe 2008: Objects, Components, Models and Patterns, Zurich, July 2008, Springer LNBP, Vol. 11. R. Paige, B. Meyer (Eds.), ISBN: 978-3-540-69823-4.
- [17] M. Brambilla, J. Cabot, S. Comai. "Automatic Generation of Workflow-Extended Domain Models". MoDELS 2007: Model Driven Engineering Languages and Systems, 10th International Conference, Nashville, USA, October 2007. LNCS 4735 Springer, ISBN 978-3-540-75208-0: pp. 375-389.
- [18] M. Brambilla, F. Facca. "Building Semantic Web Portals with WebML", 7th International Conference on Web Engineering, ICWE 2007, Como, Italy. Springer LNCS 4607, ISBN 978-3-540-73596-0, pp. 312-327.
- [19] S. Ceri, M. Brambilla, E. Della Valle. "Design Abstractions for Innovative Web Applications: The Case of the SOA Augmented with Semantics". 4th European Semantic Web Conference, ESWC 2007, Innsbruck, Springer LNCS 4519, ISBN 978-3-540-72666-12007, pp. 4-15.
- [20] A. Bozzon, M. Brambilla, P. Fraternali, P. Speroni. "Bringing Internet Architectures into the Plant: The Case of HMI". European Control Conference, IFAC/ACPA/IEEE ECC 2007, pp. 5530-5537. Kos, Greece, July 2007. ISBN: 978-960-89028-5-5.
- [21] A. Bozzon, M. Brambilla, P. Fraternali, P. Speroni, G. Toffetti. "Applying Web-based Networking Protocols and Software Architectures for providing adaptivity, personalization, and remotization features to Industrial Human Machine Interface Applications". IEEE AINA 2007, pp. 940-947, Niagara Falls, On, Canada, May 2007.
- [22] M. Brambilla, I. Celino, S. Ceri, D. Cerizza, E. Della Valle, F. Facca. "A Software Engineering Approach to Design and Development of Semantic Web Service Applications", International Semantic Web Conference (ISWC2006), Athens, USA, November 2006, Springer LNCS 4273, pp. 172-186.
- [23] M. Brambilla, J. Cabot. "Constraint tuning and management for web applications", 6th International Conference on Web Engineering (ICWE2006), Luglio 2006, Palo Alto, CA, USA, ACM Press, pp. 345 - 352, 2006, ISBN:1-59593-352-2.
- [24] M. Brambilla, S. Ceri, S. Comai, C. Tziviskou. "Exception Handling in Workflow-Driven Web Applications", World Wide Web International Conference (WWW'05), ACM Press, Chiba (Japan), May 10-13 2005, Proceedings, pp. 170-179, ISBN:1-59593-046-9.

- [25] M. Brambilla, S. Ceri, P. Fraternali, R. Acerbis, A. Bongio. "Model based design of service intensive Web applications", ACM SIGMOD/PODS 2005, Industrial track, Baltimore, 2005, pp. 851-856, ISBN:1-59593-060-4 .
- [26] M. Brambilla, A. Deutsch, L. Sui, V. Vianu. "The Role of Visual Tools in a Web Application Design and Verification Framework: A Visual Notation for LTL Formulae", 5th International Conference on Web Engineering (ICWE2005), Proceedings. Lecture Notes in Computer Science (LNCS), Springer, Vol. 3579, pp. 557-568, August 2005, Sydney, Australia, ISBN: 3-540-27996-2.
- [27] M. Brambilla. "Extending hypertext conceptual models with process-oriented primitives", Conceptual Modeling - ER 2003, 22nd International Conference on Conceptual Modeling, Chicago, IL, USA, October 13-16, 2003, Proceedings. Lecture Notes in Computer Science (LNCS), vol. 2813, Springer 2003, ISBN 3-540-20299-4, pp. 246-262.
- [28] M. Brambilla, N. D'Elia. "Exception Handling within Workflow-based Web Applications", 4th International Conference on Web Engineering (ICWE) 2004, Munich, Germany, 2004 – Proceedings. Lecture Notes in Computer Science (LNCS), Springer, Vol. 3140, pp. 103-116, ISBN: 3-540-22511-0.
- [29] M. Brambilla, S. Ceri, M. Passamani, A. Riccio. "Managing Asynchronous Web Services Interactions", IEEE International Conference on Web Services (ICWS) 2004, San Diego, CA, USA, IEEE Computer Society, ISBN: 0-7695-2167-3.

Short works:

- [30] M. Brambilla, J.C. Preciado, M. Linaje, and F. Sanchez-Figueroa, "Business Process -based Conceptual Design of Rich Internet Applications", Proceedings of ICWE 2008, IEEE Press, July 2008, Yorktown Heights, USA, pp. 155-161.
- [31] M. Brambilla, A. Origgi. "MVC-Webflow: an AJAX Tool for Online Modeling of MVC-2 Web Applications", Demo at ICWE 2008, IEEE Press, July 2008, Yorktown Heights, USA, pp 344-349.
- [32] M. Brambilla, J. Cabot, N. Moreno. "Tool Support for Model Checking of Web Application Designs". Industrial paper at 7th International Conference on Web Engineering, ICWE 2007, Como, Italy. Springer LNCS 4607, ISBN 978-3-540-73596-0, pp. 533-538
- [33] M. Brambilla, S. Ceri, S. Comai, M. Dario, P. Fraternali, I. Manolescu. "Declarative Specification of Web Applications exploiting Web Services and Workflows", Demonstration at ACM SIGMOD/PODS 2004 Conference, 2004, Paris, France, ACM Press, pp. 909-910, ISBN:1-58113-859-8.

Workshop papers:

- [34] M. Brambilla, S. Ceri, F. Facca, C. Tziviskou, I. Celino, D. Cerizza, E. Della Valle, A. Turati. "WebML and Glue: an integrated discovery approach for the SWS Challenge". Workshop on Service Composition & SWS Challenge (SerComp & SWS Challenge 2007), IEEE/WIC/ACM International Conferences on Web Intelligence and Intelligent Agent Technology (wi-iatw), 2007.
- [35] M. Brambilla, I. Celino, S. Ceri, D. Cerizza, E. Della Valle, Federico M. Facca, C. Tziviskou. "Flexible Specification of Semantic Services using Web Engineering Methods and Tools". In Proceedings of the 2nd International Workshop on Semantic Web Enabled Software Engineering (SWESE 2006), ISWC 2006, Athens, GA, USA, November 2006, pp. 1-14, http://km.aifb.uni-karlsruhe.de/ws/swese2006/final/brambilla_full.pdf. This paper won the "Best Paper Award".
- [36] M. Brambilla, P. Fraternali, M. Tisi. "A Metamodel transformation framework for the Migration of WebML models to MDA". Model-Driven Web Engineering Workshop (MDWE) at MODELS 2008, Toulouse, September 30, 2008. In print.