

# Curriculum vitæ

Iulian OBER

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## Contact

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## Education

**2001** : *Ph.D. in Computer Science and Telecommunications*, Institut National Polytechnique de Toulouse - École Nationale Supérieure d'Électronique, Électrotechnique, Informatique, d'Hydraulique et de Télécommunications de Toulouse (ENSEEIH).

*Title* : Specification and Validation of Timed Systems with  
Formal Description Languages

*Advisor* : Prof. Bernard COULETTE

*Reviewers* : M. Joseph SIFAKIS, CNRS/Verimag  
M. Roland GROZ, CNET

Thesis defended on September 21st, 2001. Mention: "Très honorable".

**1998** : *M.Sc. in Computer Science, Babeş – Bolyai University of Cluj, Romania.*

*Title* : Design and implementation of a back-end for a UML/OCL CASE tool.

Thesis prepared while in internship at Vérilog (Toulouse, France).

First-class honours, ranking 1st.

**1997** : *B.Sc. in Mathematics and Computer science*, Babeş – Bolyai University of Cluj, Romania. First-class honours, ranking 1st.

## Academic and other research positions

**2005 - today** : **Associate Professor (tenured)** ("Maître de conférences") – University of Toulouse, Technology Institute of Blagnac. Member of IRIT - a public research laboratory of CNRS and the University of Toulouse.

**2003 - 2005** : **Researcher** – Verimag. Verimag is a public research laboratory of CNRS, Joseph Fourier University of Grenoble and Grenoble INP.

**2002 - 2003 : Post-doctoral fellow** – Verimag laboratory.

**1998 - 2001 : R&D engineer**, Vérilog S.A. / Télélogic A.B., Toulouse (while Ph.D. candidate).

**1995 - 1998 : Research Assistant**, Computer Science Laboratory, Babeş – Bolyai University of Cluj, Romania (while undergraduate and Masters student).

## Sabbaticals

**2011, spring semester** – Research leave granted by the French National Universities Council (CNU).

## Research interests

- Applying constraint satisfaction and optimization methods to system design problems: non-functional calibration, sensitivity analysis, design space exploration, etc. Formal model extraction from model-based designs.
- Improving the applicability of simulation and model-checking techniques based on domain and model-specific information (e.g., custom partial-order reductions, custom debugging and tracing models, etc.).
- Asynchronous-synchronous model integration and refinement.

## Published work

Indicators : H-index = 9, G-index = 18

(sources : CNRS-LIMSI HView and Quadsearch, on Sept. 1st, 2010)

## Refereed International Journal Articles

- [1] Josef Hooman, Iulian Ober, Hillel Kugler, Angelika Votintseva, and Yuri Yushtein. Supporting UML-based Development of Embedded Systems by Formal Techniques. *Software and Systems Modeling*, 7(2):131–155, 2008.
- [2] Iulian Ober, Susanne Graf, Yuri Yushtein, and Ileana Ober. Timing analysis and validation with UML: the case of the embedded MARS bus manager. *Innovations in Systems and Software Engineering*, 4(3):301–308, 2008.
- [3] Susanne Graf, Ileana Ober, and Iulian Ober. A real-time profile for UML. *International Journal on Software Tools for Technology Transfer*, 8(2):113–127, 2006.
- [4] Iulian Ober, Susanne Graf, and Ileana Ober. Validating timed UML models by simulation and verification. *International Journal on Software Tools for Technology Transfer*, 8(2):128–145, 2006.

## Refereed National Journal Articles

- [5] Xavier Dumas, Sébastien Gabel, Julien Honore, Maurice Heitz, and Iulian Ober. Une implémentation TOPCASED supportant un processus multi-formalisme de développement par transformation de modèles. *Revue de l'Electricité et de l'Electronique*, 2009(2):45–51, February 2009.
- [6] Susanne Graf and Iulian Ober. Software and architecture modelling with Omega-UML and validation with IF. *Génie Logiciel*, 1(80):21–26, 2007.
- [7] Iulian Ober, Ileana Ober, Susanne Graf, and David Lesens. Projet OMEGA : un profil UML et un outil pour la modélisation et la validation de systèmes temps réel . *Génie Logiciel*, 1(73):33–38, June 2005.
- [8] Vasile M. Scuturici and Dan M. Suciulian Ober, Mihaela Scuturici. Specification of Active Objects Behavior Using Statecharts. *Studia Universitatis Babeş – Bolyai, Informatica*, XLII(1):19–30, 1997.
- [9] Marius Bozga, Dan Chiorean, and Iulian Ober. A Compiler for an Algebraic Specification Language. *Studia Universitatis Babeş – Bolyai, Informatica*, XLI(1):59–70, 1996.

## Monograph chapters and invited contributions

- [10] Iulian Ober. UML-based modelling and verification of real-time systems. In Laurent Pautet, Béatrice Berard, and Serge Haddad, editors, *ETR (Ecole Temps Réel) Summerschool 2009*, pages 113–126. Télécom ParisTech, September 2009.
- [11] Marius Bozga, Susanne Graf, Laurent Mounier, and Iulian Ober. Modeling and Verification of Real-Time Systems using the IF Toolbox. In Nicolas Navet and Stefan Merz, editors, *Modeling and Verification of Real-time Systems*, chapter 10, pages 319–352. Wiley, January 2008.
- [12] Marius Bozga, Susanne Graf, Laurent Mounier, and Iulian Ober. La boîte à outils IF. In Nicolas Navet, editor, *Systèmes Temps Réel: Techniques de description et de vérification*, volume I, chapter 9, pages 293–326. Hermès, 2006.
- [13] Marius Bozga, Susanne Graf, Ileana Ober, Iulian Ober, and Joseph Sifakis. The IF Toolset. In Marco Bernardo and Flavio Corradini, editors, *Formal Methods for the Design of Real-Time Systems, International School on Formal Methods for the Design of Computer, Communication and Software Systems, SFM-RT 2004, Bertinoro, Italy, September 13-18, 2004, Revised Lectures*, volume 3185 of *LNCS*, pages 237–267. Springer, 2004.

## Refereed Conference Proceedings

- [14] Iulian Ober and Iulia Dragomir. Unambiguous UML composite structures: the OMEGA2 experience. In Rastislav Královic, editor, *SOFSEM 2011 - International Conference on Current Trends in Theory and Practice of Computer Science (Nový Smokovec, Slovakia, 22-28 January, 2011)*, LNCS. Springer, January 2011. To be published.

- [15] Iulian Ober and Iulia Dragomir. OMEGA2: A new version of the profile and the tools. In *14th IEEE International Conference on Engineering of Complex Computer Systems, UML & AADL track, Oxford, UK, March 24-25, 2010*, pages 373–378. IEEE, 2010.
- [16] Xavier Dumas, Tristan Faure, Maurice Heitz, Iulian Ober, and David Lesens. Supporting a Multi-formalism Model Driven Development Process with Model Transformation, a TOP-CASED Implementation. In *European Congress on Embedded Real-Time Software (ERTS), Toulouse, France, Jan 30 - Feb 01, 2008*. SIA/3AF/SEE, January 2008.
- [17] Iulian Ober, Bernard Coulette, and Younes Lakhrissi. Behavioral Modelling and Composition of Object Slices Using Event Observation. In Jean-Michel Bruel, Krzysztof Czarnecki, and Ileana Ober, editors, *ACM/IEEE International Conference on Model Driven Engineering Languages and Systems (MODELS), Toulouse, France, Sept 28 - Oct 03, 2008*, number 5301 in LNCS, pages 219–233. Springer, 2008.
- [18] Iulian Ober and Nicolas Halbwachs. On the timed automata-based verification of Ravenscar systems. In Tullio Vardanega and Fabrice Kordon, editors, *International Conference on Reliable Software Technologies - Ada-Europe 2008, Venice, Italy, June 16-20, 2008*, number 5026 in LNCS, pages 30–43. Springer, 2008.
- [19] Iulian Ober and Younes Lakhrissi. Observation-based interaction and concurrent aspect-oriented programming. In Roger Lee, editor, *International Conference on Software Engineering Research, Management and Applications (SERA), Prague, Czech Republic, August 20-22, 2008*, number 150 in SCI, pages 141–156. Springer, 2008.
- [20] Iulian Ober, Susanne Graf, and David Lesens. Modeling and validation of a software architecture for the Ariane-5 launcher. In Roberto Gorrieri and Heike Warheim, editors, *Formal Methods for Open Object-Based Distributed Systems, 8th IFIP WG 6.1 International Conference, FMOODS 2006, Bologna, Italy, June 14-16, 2006*, volume 4037 of LNCS, pages 48–62. Springer, 2006.
- [21] Iulian Ober, Susanne Graf, and Ileana Ober. Validation of UML Models via a Mapping to Communicating Extended Timed Automata. In Susanne Graf and Laurent Mounier, editors, *Model Checking Software, 11th International SPIN Conference, Barcelona, Spain, April 1-3, 2004, Proceedings*, volume 2989 of LNCS, pages 127–145. Springer, 2004.
- [22] Marius Bozga, Susanne Graf, Laurent Mounier, Iulian Ober, Jean-Luc Roux, and Daniel Vincent. Timed Extensions for SDL. In Rick Reed and Jeanne Reed, editors, *SDL 2001: Meeting UML, 10th International System Design Languages Forum, Copenhagen, Denmark, June 27-29, 2001, Proceedings*, volume 2078 of LNCS, pages 223–240. Springer, 2001.
- [23] Iulian Ober and Alain Kerbrat. Verification of Quantitative Temporal Properties of SDL Specifications. In Rick Reed and Jeanne Reed, editors, *SDL 2001: Meeting UML, 10th International System Design Languages Forum, Copenhagen, Denmark, June 27-29, 2001, Proceedings*, volume 2078 of LNCS, pages 182–202. Springer, 2001.
- [24] Iulian Ober and Alain Kerbrat. Specification and execution of tests using tMsc. In Jianping Wu, Samuel T. Chanson, and Qiang Gao, editors, *Formal Methods for Protocol Engineering and Distributed Systems, FORTE XII / PSTV XIX'99, IFIP TC6 WG6.1 Joint*

*International Conference on Formal Description Techniques for Distributed Systems and Communication Protocols (FORTE XII) and Protocol Specification, Testing and Verification (PSTV XIX), October 5-8, 1999, Beijing, China*, volume 156 of *IFIP Conference Proceedings*, pages 453–468. Kluwer, 1999.

- [25] Iulian Ober and Ileana Stan. On the Concurrent Object Model of UML. In Patrick Amestoy, Philippe Berger, Michel J. Daydé, Iain S. Duff, Valérie Frayssé, Luc Giraud, and Daniel Ruiz, editors, *Euro-Par '99 Parallel Processing, 5th International Euro-Par Conference, Toulouse, France, August 31 - September 3, 1999, Proceedings*, volume 1685 of *LNCS*, pages 1377–1384. Springer, 1999.

### Refereed Workshop Papers

- [26] Iulian Ober, Susanne Graf, and Yuri Yushtein. Using an UML profile for timing analysis with the IF validation tool-set. In Holger Giese, Bernhard Rumpe, and Bernhard Schätz, editors, *Dagstuhl-Workshop MBEEES 2006: Modellbasierte Entwicklung eingebetteter Systeme*, volume 2006-1 of *Informatik-Bericht*, pages 75–84. TU Braunschweig, Institut für Software Systems Engineering, 2006.
- [27] Iulian Ober, Susanne Graf, and Yuri Yushtein. Timing analysis and validation of the embedded mars bus manager. In *MARTES'2005: Modeling and Analysis of Real-Time and Embedded Systems, MoDELS satellite workshop, Jamaica, Oct, 2005*, Verimag Technical Report, 2005.
- [28] Iulian Ober, Susanne Graf, and Ileana Ober. Validating timed UML models by simulation and verification. In *Workshop on Specification and Validation of UML models for Real Time and Embedded Systems (SVERTS 2003), a satellite event of UML 2003, San Francisco, October 2003*, October 2003.
- [29] M. Bozga, S. Graf, A. Kerbrat, L. Mounier, I. Ober, and D. Vincent. SDL for Real-Time: What is Missing? The 2nd Workshop on SDL and MSC, Grenoble, June 2000.
- [30] A. Kerbrat and I. Ober. Automated test generation from SDL/UML specifications. The 12th International Software Quality Week, San Jose, California, May 1999.

### Syntheses of Workshops and Symposia

- [31] Iulian Ober. MODELS Research Projects Symposium. In Michel Chaudron, editor, *Models in Software Engineering, Workshops and Symposia at MODELS 2008*, volume 5421 of *LNCS*, pages 400–401. Springer, April 2009.
- [32] Iulian Ober, Stefan Van Baelen, Susanne Graf, Mamoun Filali, and Thomas Weigert. Model Based Architecting and Construction of Embedded Systems. In Michel Chaudron, editor, *Models in Software Engineering, Workshops and Symposia at MODELS 2008*, volume 5421 of *LNCS*, pages 1–4. Springer, April 2009.
- [33] Susanne Graf, Sébastien Gérard, Oystein Haugen, Iulian Ober, and Bran Selic. Modeling and Analysis of Real-time and Embedded Systems - Using UML. In Thomas Kühne, editor, *MoDELS'2006 Workshops*, volume 4364 of *LNCS*, pages 126–130. Springer, January 2007.

- [34] Susanne Graf, Sébastien Gérard, Oystein Haugen, Iulian Ober, and Bran Selic. Workshop synthesis: Modeling and analysis of real-time embedded systems. In Jean-Michel Bruel, editor, *Satellite Events at the MoDELS 2005 Conference*, volume 3844 of *LNCS*, pages 58–66. Springer, 2006.

## Projects and grants (as leader)

### **2009-2011 : European Space Agency Project 22618/09/NL/JK “FullMDE : Full Model Driven Development for On-Board Software”**

Partners : Astrium Space Transportation, Esterel Technologies, IRIT, Verimag, Praxis

Description of work: adaptation of the Omega modeling and validation methods to system level models in SysML.

Role: leader of the IRIT team.

### **2008-2010 : European Space Agency Activity 3-12639 “OMEGA2”**

Partners : IRIT, Verimag

Description of work: upgrading the Omega modeling and validation platform for UML version 2.x and support for integrating the platform in ESA’s operational environment.

Role: leader

### **2004-2007 : National Research Agency (ANR) Project RNTL-PERSIFORM “Performance engineering based on simulation of formal functional models”**

Partners: France Telecom R&D, Verimag, Institut National des Télécommunications (INT), IRISA, Orpheus. Description of work: integration of performance modeling and evaluation in a development process, by extension of functional modeling languages (UML activity diagrams) and bridging with queuing networks models and languages (HyPerformix).

Role: leader of the Verimag team.

## Projects and grants (as co-investigator)

### **2008-2011 : SoCKET - French DGE Project “System on Chip Toolkit For Critical Embedded Systems”**

Partners: 20 partners from academia and industry. Leader: ST Microelectronics.

Overall project goal: integration of model driven techniques in the design flow of systems-on-chip (SoC). Contribution: support and case studies on using Omega SysML for the modeling and validation of SoC designs.

### **2004-2007 : ASSERT - EU Integrated Project IST “Automated proof based System and Software Engineering for Real-Time Systems”**

Partners: 26 partners from academia and industry. Leader: European Space Agency (ESA)  
Contribution: Study and semantics definition of the ASSERT modeling language. Alignment between ASSERT models and Omega UML, tool integration.

**2002-2005 : OMEGA - EU Project IST “Correct Development of Real-Time Embedded Systems in UML”**

Partenaires: Verimag (leader), France Telecom R&D, EADS, Israel Aircraft Industries, NLR, Université de Kiel, Universit de de Nijmegen, Weizmann Institute of Science, OFFIS, Centrum Wiskunde en Informatica (CWI).

Contribution: Definition of a UML profile for real-time critical systems (Omega UML). Definition of semantics. Design and implementation of simulation and model checking tools. Application on industry case studies from partners Astrium, NLR and IAI.

**2000-2002 : INTERVAL - EU Project IST “Formal Design, Validation and Testing of Real-Time Telecommunications Systems”**

Partners: Ericsson, Telelogic, Teletel, Solinet, Verimag, France Telecom R&D.

Contribution: Timed constraints definition framework for the SDL language. Extension of the Telelogic ObjectGeode tool to timed verification and test-case generation.

## Program committees

- 13th ACM/IEEE International Conference on Model Driven Engineering Languages and Systems, 2010
- 3rd International Workshop on the Certification of Safety-Critical Software Controlled Systems (SafeCert), 2010
- 3rd International Workshop on Model Based Architecting and Construction of Embedded Systems (ACES<sup>MB</sup>), 2010
- 2nd International Workshop on the Certification of Safety-Critical Software Controlled Systems (SafeCert), 2009
- 2nd International Workshop on Model Based Architecting and Construction of Embedded Systems (ACES<sup>MB</sup>), 2009
- MODELS Doctoral Symposium 2009,
- 1st International Workshop on the Certification of Safety-Critical Software Controlled Systems (SafeCert), 2008
- 1st International Workshop on Model Based Architecting and Construction of Embedded Systems (ACES<sup>MB</sup>), 2008
- MODELS Research Project Symposium 2008
- 2nd International Workshop on Modeling and Analysis of Real-Time Embedded Systems (MARTES), 2006
- 1st International Workshop on Modeling and Analysis of Real-Time Embedded Systems (MARTES), 2005

Reviewer for the following journals:

- Journal of Control Engineering Practice (Elsevier)
- IEEE Transactions on Industrial Informatics (IEEE)

## Conference and workshop organization, steering committees

- 15th International Conference on System Design Languages (SDL Forum 2011) : General co-chair
- International Workshop on Model Based Architecting and Construction of Embedded Systems (ACES<sup>MB</sup>): Steering Committee, Organizing Committee (2008,2009,2010)
- MODELS Research Project Symposium 2008 : Chair
- 2nd International Workshop on Modeling and Analysis of Real-Time Embedded Systems (MARTES): Organizing Committee (2005,2006)

## Invited talks, contributions, tutorials

- Invited talk at ETR (Ecole Temps Réel) Summerschool 2009, Télécom ParisTech, September, 2009
- Invited talk at Dagstuhl Seminar 09361 on Design and Validation of Concurrent Systems, September, 2009
- Chapter in monograph *Modeling and Verification of Real-time Systems*, Stephan Merz, Nicolas Navet (ed.), John Wiley & Sons, 2008
- Invited talk at Dagstuhl Seminar 07241 on Tools for the Model-based Development of Certifiable Systems, June, 2007
- Chapter in monograph *Systèmes Temps Réel: Techniques de description et de vérification*, Nicolas Navet (ed.), Hermès, 2006
- Invited lecture “Modeling of Real-Time Systems with SDL and UML”, University of Applied Science, Hagenberg, Austria, 2005
- Tutorial on “IF: A Validation Environment for Real-time UML and SDL Models”, at 12th International Conference on System Design Languages (SDL Forum), Copenhagen, Denmark, 2005
- Tutorial on “IF Validation Environment”, at 11th International SPIN Workshop on Model Checking of Software, Barcelona, Spain, 2004

## Graduate students and committees

### Ph.D. students

- Younes Lakhrissi (graduated in July, 2010) – co-advisor: B. Coulette  
Subject: Integration of behavior models in view-based analysis and design.

- Hong-Viet Luong (graduated in October, 2010) – co-advisors: C. Percebois, A-L. Courbis, T. Lambolais  
Subject: Incremental construction and verification of system specifications.
- Iulia Dragomir – co-advisor: C. Percebois  
Subject: System to software level refinement of embedded system designs.
- El Arbi Abussoror – co-advisor: Ileana Ober  
Subject: Advanced diagnostic methods in formal model validation. Applications to systems-on-chip (SoC).

### **M.Sc. students**

- Julien Hadba (graduated in July, 2010)  
Subject: Modeling, simulation and verification of ATV's solar panel deployment sub-system with Omega SysML.
- Iulia Dragomir (graduated in July, 2010)  
Subject: Semantic formalization and verification of composite structures.
- Ouzzin Ben Haddou (graduated in July, 2009)  
Subject: A case study on formal modeling and validation of a space application from CNES.
- Tristan Faure (graduated in July, 2007)  
Subject: Integration of the Omega UML profile and tools in the ASSERT IDEA framework.

### **Ph.D. committees (as external examiner)**

- Yassine Chkouri, April 7th, 2010. Advisor : Joseph Sifakis

### **Other service activities**

**May, 2010** : Member of the “Comité de sélection” (recruitment commissions) for Assistant Professor position MCF 0508, at University of Pau (UPPA).

**May, 2010** : Member of the “Comité de sélection” (recruitment commissions) for Assistant Professor position MCF 0509, at University of Pau (UPPA), Bayonne Technological Institute.

**2009 -** : Member of the “Comité Scientifique Qualifié” (permanent committee appointing the faculty recruitment commissions) in Computer Science at Toulouse 2 University

**2007 - 2009** : Member of the “Commission de spécialistes” (permanent faculty recruitment commission) in Computer Science at Toulouse 2 University