Massimo Tisi

- Assistant Professor
- Department of automation, production and computer science (DAPI)
- IMT Atlantique
- LS2N laboratory (UMR CNRS 6004)
- Address: rue Alfred Kastler, BP 20722 F-44307 Nantes Cedex 3
- Phone: +33 2 5185 8704
- Email: massimo.tisi@imt-atlantique.fr
- Homepage: https://massimotisi.github.io/

Contents

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1 Research highlights

1.1 Short bio

Since 2010, I hold an Assitant Professor (Maitre Assistant) position in the Department of Automation, Production and Computer Science at IMT Atlantique (formerly Ecole des Mines de Nantes). I'm deputy team leader of the Naomod team (LS2N, UMR CNRS 6004).
I obtained my M.Sc. in Computer Science and Engineering at Politecnico di Milano in 2005 (100/100) and my Ph.D. in Information Engineering (mark A) in April 2009, with a thesis on Model Transformations for Artifact Generation in Model-Driven Environments (advisor prof. Piero Fraternali).
Since the beginning of my career, my research focused on the design, implementation and evaluation of novel methods and tools for modeling software systems and reasoning on software models. The scientific work, which resulted in high-profile publications, has always been supported by substantial implementation and demonstration efforts, and by a continuos interaction with industry. While during my doctoral studies I was focused on modeling a precise application domain (data-intensive Web applications), moving to IMT Atlantique I expanded the spectrum of modeled applications. Recently I have started to look outside of purely software systems, by considering hybrid hardware/software models for cyber-physical systems.
During my doctoral studies I have been visiting researcher at the McGill university (Montreal, Canada, 2007), where I came in contact with multi-paradigm heterogeneous modeling. Later I have been several times a visiting researcher at the National Institute of Informatics (NII) in Tokyo, Japan, where I collaborated on advancing the state of the art in bidirectional transformations.

1.2 Publications and visibility

I am widely recognized as an expert in model transformation, notably for extending the model-transformation paradigm to higher-order model transformations, and for my contributions to the ATL language since 2010. In particular, my article "On the Use of Higher-Order Model Transformations" has collected 252 citations since 2009 (up to June 2023 - Google Scholar). I have an h-index of 26 (June 2023 - Google Scholar).

My top five publications are:

- Zheng Cheng, Massimo Tisi, Remi Douence. CoqTL: a Coq DSL for rule-based model transformation. Software and Systems Modeling 19 (2), 2020, pages 425-439, Springer.
- Amine Benelallam, Abel Gómez, Massimo Tisi, and Jordi Cabot. Distributing relational model transformation on MapReduce. Journal of Systems and Software, 142:1–20, 2018. Elsevier.
- Soichiro Hidaka, Frederic Jouault, Massimo Tisi: On Additivity in Transformation Languages. Proceedings of the International Conference on Modeling Languages and Systems, MODELS 2017, Springer.
- Soichiro Hidaka, Massimo Tisi, Jordi Cabot, Zhenjiang Hu: Feature-based classification of bidirectional transformation approaches. Software and System Modeling, Volume 15(3), 2016, Pages 907-928, Springer.
- Massimo Tisi, Frédéric Jouault, Piero Fraternali, Stefano Ceri, Jean Bézivin: On the Use of Higher-Order Model Transformations. Proceedings of the 5th European Conference on Model Driven Architecture - Foundations and Applications, 2009, Pages 18–33, Springer.

Awards:

- Nominee for Best Paper Award in the European Joint Conferences on Theory and Practice of Software 2017 (ETAPS 2017) for the article: Zheng Cheng, Massimo Tisi, A Deductive Approach for Fault Localization in ATL Model Transformations.
- Nominee for Best Paper Award in the International Conference for Software Testing 2017 (ICST 2017) for the article: Zheng Cheng, Massimo Tisi, Incremental Deductive Verification for Relational Model Transformations.
- Best Performance Award for the ATL solution to the Transformation Tool Contest 2017 (TTC 2017), at the Software Technologies: Applications and Foundations Conference 2017 (STAF 2017).
- Best paper award in the International Conference on Web Engineering 2009 (ICWE 2009) for the article: Fraternali, P., Tisi, M.: A higher-order generative framework for weaving traceability links into a code generator for Web application testing.

- Best paper award in the International Workshop on Model Driven Web Engineering 2008 (MDWE 2008) for the article: Brambilla, M., Fraternali, P., Tisi, M.: A Metamodel Transformation Framework for the Migration of WebML Models to MDA.

1.3 Funding and Project Management

I have worked in several national (Italian and French), and European research projects, as well as with several companies for research exploitation and technology transfer (including Sodifrance, Atos, Thales, and several SMEs). I have secured more than 1.5M Euro in fundings from European and national projects.

Highlights:

- Coordinator for the Lowcomote project: Training the Next Generation of Experts in Scalable Low-Code Engineering Platforms (2019-2023: Marie Curie International Training Network).
- Work-package leader in the MONDO project: Scalable Modeling and Model Management on the Cloud (2013-2016: 7th Framework Programme, STREP 2012). Mention: **Excellent**.
- Principal investigator for Ecole des Mines de Nantes in the AutoMobile project: Automated Mobile App Development (2013-2015: 7th Framework Programme, Research for SMEs). Mention: **Excellent**.

1.4 Research Community Service

I have served as General Chair of the Software Technologies: Applications and Foundations 2022 (STAF 2022) Federated Conference. I co-organized succesful workshop series on Scalability in Model Driven Engineering (BigMDE) and Modeling in Low-Code Development Platforms (LowCode). I have served in the program committee of several international conferences and workshops in software engineering, including the leading conferences on modeling (MODELS), model transformation (ICMT) and software language engineering (SLE). I was Artifact Chair in MODELS, and co-organizer of the Project Showcase at STAF.
I reviewed for top journals in software engineering, including Transactions of Software Engineering, Journal of Software: Evolution and Process, Software and System Modeling, Science of Computer Programming. I was editor for a special section of the Software and System Modeling journal.
I am member of the Monitoring and Evaluation Committee at the Pôle Images & Réseaux.

1.5 Teaching and Academic Supervision

Since 2013 I am lecturer of Domain-Specific Languages and Model-Driven Engineering (master level) and of Databases (bachelor level) at IMT Atlantique. I co-advised 10 PhD students and 7 postdocs and research engineers. I am member of the council of the SPIN doctoral school, and of co-responsible of the Doctoral Affairs at the LS2N laboratory.

1.6 Main research areas

Model Transformation Languages

In the scope of model-driven engineering, model transformation aims to provide a mean to specify the way to produce target models from a number of source models. For this purpose, it enables developers to define the way source model elements must be matched and navigated in order to initialize the target model elements. Formally, a model transformation has to define the way for generating a model Mb, conforming to a metamodel MMb, from a model Ma conforming to a metamodel MMa. In practice, model transformations are widely used in model-driven engineering, e.g. during code generation (their originally intended use case), translation among modeling languages, data translation for interoperability, controlled updates over a model at runtime.
I have investigated different paradigms for model transformation, including the relational paradigm (exemplified by the ATL transformation language), the functional paradigm (exemplified by the OCL language), the data-flow paradigm (exemplified by the fUML language). I have studied correspondences between these paradigms and translations among them.

I have contributed at clarifying the properties of transformation languages, especially bidirectionality (by feature modeling the design space of bidirectional transformations) and recently additivity, a property relating the syntactic constructs of the transformation specification to their semantic output. Finally I have distinguished the important class of higher-order transformations, i.e. transformations that manipulate other transformationss

Model Transformation Verification

With the increasing use of model-driven engineering in safety-critical domains (e.g., in automotive industry, medical data processing, aviation), it is crucial to develop techniques and tools that prevent incorrect model transformations from generating faulty models. The effects of such faulty models could be unpredictably propagated into subsequent MDE steps, e.g. code generation.
For this reason, there is a great need of mechanisms to ensure quality and the absence of errors in models and model transformations. Verification is one of the effective techniques that are typically used to achieve this.
Verification of models and model transformations refers to the ability of these elements to satisfy one or more correctness properties. These properties express certain characteristics that the element under analysis must feature in order to be considered correct. It is typical for verification tools to use formal methods to determine whether the model or model transformation under analysis satisfies the correctness properties under scrutiny.
I have contributed to formalize the execution semantics of the ATL language by translation to the Boogie intermediate verification language. Based on this semantics I have designed a fault localization method, capable of pinpointing the faulty lines of a transformation that does not respect a contracts.
I have designed a new technique for the decomposition of transformation contracts, to improve the efficiency of the automatic verification process on a SMT solver. I have contributed an incremental verification technique, so that after a change to the system, only the impacted part needs to be reverified. This idea greatly increases the applicability of transformation verification in industrial scenarios.

Scalability of Model-Driven Engineering

The increasing adoption of Model-Driven Engineering in industrial contexts highlights scalability as a critical limitation. Indeed, several Model-driven tools show critical efficiency limitations in handling very large models (VLMs), e.g. models made by millions of model elements, not unusual in real-life industrial scenarios. Examples of such models appear both at development time, e.g. while reverse-engineering big systems and at runtime, e.g. coming from a set of sensors, from OpenData repositories or when building applications on social networks. Moreover, the proliferation of models produced as input-outputs of software engineering tasks at development/maintenance time also highlights scalability problems in the management of the model artifacts.
In order to tackle the scalability problem I research solutions on three main axes:

- Efficient Transformation. Performing only the strictly required computation on models improves scalability, as only parts of VLM need to be loaded and manipulated. I provided the following support for the efficient execution of model-to-model transformations: 1) An engine for the incremental execution of model-to-model transformations, performing only the necessary re-computations; 2) A lazy execution semantics for model transformations, delaying the computation to when it is strictly needed; 3) An engine for the event-driven reactive execution of model transformations, where the engine performs only the computation needed to react to model updates and requests from the user application.
- Parallel Transformation. The previous techniques increase efficiency by avoiding unnecessary computation. However, this is not always possible, as several transformations perform global algorithms on the whole model. In this scenario, a solution for the scalability problem would be the parallelization of the transformation with the aim of decomposing it in smaller independent problems, more easily manageable with current tools. In this context, I conceived 1) A shared-memory implicit parallel execution engine for the ATL transformation language and 2) A distributed framework for model transformation on the Map-Reduce programming model. In particular automatic model distribution is performed within the cluster, by a streaming partitioning algorithm over the input model.
- Efficient Model Persistence. Very large models need high-performance mechanism for their storage and access. Traditional approaches are file-based, especially XML-based, or rely on relational databases. I investigated innovative mechanisms for model storage, by relying on map-databases, graph-databases and distributed hash-tables. These approches have recently converged in the NeoEMF model persistence tool.

2 Research projects

I participated for the NaoMod team to the following funded collaborative projects:

- RODIC: ANR project on Rapid recOnfiguration of manufacturing systems (Co-investigator, 2022-2026)
- SEPTIME: Institut Carnot F2E project on a Sensor-Enhanced Projection Tool Informed by an Epidemiological Model (Principal Investigator, 2022-2024)
- AIDOaRT: H2020-ECSEL project on AI-augmented automation supporting modeling, coding, testing, monitoring, and continuous development in Cyber-Physical Systems (Co-investigator, 2021-2024)
- CyprIoT: a RFI Atlanstic2020 collaboration with UQAC on Model-Driven Engineering for the Internet of Things (Principal Investigator, 2020)
- Lowcomote: Marie Curie European Training Network (ETN) on Low-Code Engineering Platforms (Coordinator, 2019-2023)
- CYCLOPS: ANR MRSEI project on Domain-Specific Model-Centric Engineering of Smart Cyber-Physical Systems of Systems (Coordinator, 2019-2021)
- MegaM@RT2: ECSEL project on a scalable model-based framework for continuous development and runtime validation of complex systems (Co-investigator, 2017-2020)

With the AtlanMod team I have been principal investigator for the following funded collaborative projects (besides participating in several others):

- MONDO: EC FP7 STREP project on scalable model-driven engineering (Principal Investigator, 2013-2016)
- AutoMobile: EC FP7 Research for SMEs project on Automated Mobile App Development (Principal Investigator, 2013-2015)
- StreamMaster: Pole Images et Reseaux PME 2011 project on Smart Management of Document Streams (Principal Investigator, 2012-2014)
- OPEES: ITEA 2 Call 3 project on Open Platform for the Engineering of Embedded Systems (Principal Investigator, 2009-2012)

When I was in Politecnico di Milano, I participated in several research projects, including:

- Energy CH-IT
- SECO: Search Computing
- BISF: Business e Innovazione senza Frontiere
- AutonomaMente

3 Supervision

Since 2022 I am member of the council of the SPIN Doctoral School and co-responsible for Doctoral Affairs at LS2N (UMR CNRS 6004).
I have co-supervised the following PhD students:

- Matthew Coyle, 2022-ongoing, Title: "Automated reconfiguration by AI-augmented model transformation", Supervision 30%, Director: Samir Loudni, LS2N
- James Pontes Miranda, 2022-ongoing, Title: "AI-Augmented Support for Model Views", Supervision 30%, Director: Gerson Sunyè, LS2N
- Josselin Enet, 2021-ongoing, Title: "Protocol-based Generic Tooling for Domain-Specific Languages", Supervision 30%, Director: Gerson Sunyè, LS2N. Publications: [IJ1]
- Zahra Rajaei, 2018-ongoing, Title: "A model-driven framework for leveraging graph deep learning in model-driven engineering", Advisor, Director: Shekoufeh Kolahdouz-Rahimi, University of Isfahan, Iran. Publications: [IW1]
- Jolan Philippe, 2020-2022, Title: "Contribution to the Analysis of the Design-Space of a Distributed Transformation Engine", Supervision 30%, Director: Gerson Sunyè, LS2N. Now postdoc at IMT Atlantique. Publications: [IC1], [IW2]
- Joachim Hotonnier, 2018-2021 (abandoned), Title: "Deep Specification for Domain-Specific Modeling", Supervision 30%, Director: Gerson Sunyè, LS2N. Now employed by Magicplan. Publications: [IC4]
- Thibault Béziers la Fosse, 2018-2021, Title: "Model-driven Methods for Dynamic Analysis applied to Energy-Aware Software Engineering", Supervision 30%, Director: Gerson Sunyè, LS2N. Now employed by Obeo. Publications: [IW5], [IW8], [IJ9], [IW3], [IC3]
- Imad Berrouyne, 2018-2021, Title: "A Model-Driven Methodology to Unify Software Engineering in the Internet of Things", Supervision 30%, Director: Jean-Claude Royer, Cotutelle IMT Atlantique et Université du Québec à Chicoutimi (UQAC), **Mention UQAC: excellent**. Now postdoc at University of Luxemburg. Publications: [IW7], [IC6], [IC5], [IJ2]
- Amine Benelallam, 2014-2016, Title: "Model transformation on distributed platforms: decentralized persistence and distributed processing", Supervision 30%, Director: Jordi Cabot, Ecole des Mines de Nantes. Now employed by Mathworks. Publications: [IC18], [IW15], [IW10], [IC15], [IW11], [IC13], [IJ12], [IJ11]

I have supervised the following postdocs and research engineers:

- Gwendal Daniel (research engineer)
- Zheng Cheng (post-doc researcher)
- Salvador Martinez Pérez (post-doc researcher)
- Valerio Cosentino (post-doc researcher)
- Zied Saidi (research engineer)
- Abel Gómez Llana (post-doc researcher)
- Hassene Choura (research engineer)

I have participated to the thesis review or defense jury of the following phd students:

- Antonio Garmendía (jury member, 8 November 2019, Universidad Autonoma de Madrid)
- Gwendal Daniel (invited jury member, 14 November 2017, IMT Atlantique)
- Romeo Marinelli (thesis reviewer, 2016, Università dell'Aquila)
- Loli Burgueño (thesis reviewer, 2016, Universidad de Málaga)
- Elena Planas Hortal (thesis reviewer, 2013, Universitat Oberta de Catalunya)
- Medhi Iraqi (jury member, 15 September 2014, Ecole Nationale Supérieure d'Arts et Métiers - CER d'Aix-en-Provence)

I have participated to the supervision committee (CSI) of the following phd students:

- Chahrazed Boudjemila (IMT Atlantique)
- Maxime Mere (INSA Rennes)
- Vianney Sicard (INRAE)
- Theo Le Calvar (ESEO Angers)

4 Conference organization and referee service

I have served as co-organizer and reviewer for the following venues.

2023

- Monitoring and Evaluation Committee at the Pôle Images & Réseaux (Member)
- International Conference on Model Driven Engineering Languages and Systems (MODELS) (Workshops PC)
- Software and System Modeling (SoSyM) (Journal reviewer)

2022

- Monitoring and Evaluation Committee at the Pôle Images & Réseaux (Member)
- Software Technologies: Applications and Foundations (STAF) (General Chair)
- Lowcode Workshop (Lowcode) (Organizer)
- International Workshop on Games and Software Engineering (GAS) (PC)
- International Workshop on Modeling Language Engineering (MLE) (PC)
- Software and System Modeling (SoSyM) (Theme section editor, Journal reviewer)

2021

- Monitoring and Evaluation Committee at the Pôle Images & Réseaux (Member)
- International Conference on Model Driven Engineering Languages and Systems (MODELS) (PC, Artifact Evaluation Chair)
- Lowcode Workshop (Lowcode) (Organizer)
- Advances in Production Management Systems (APMS)(Special Session Organizer)
- European Conference on Modelling Foundations and Applications (ECMFA) (PC)
- International Workshop on Model-Driven Engineering of Digital Twins (MODDIT) (PC)
- IEEE Transactions of Software Engineering (TSE)(Journal Reviewer)
- Software and System Modeling (SoSyM) (Journal reviewer)

2020

- Monitoring and Evaluation Committee at the Pôle Images & Réseaux (Member)
- Lowcode Workshop (Lowcode) (Organizer)
- International Conference on Model Driven Engineering Languages and Systems (MODELS) (PC)
- European Conference on Modelling Foundations and Applications (ECMFA) (PC)
- Workshop on Software Foundations for Data Interoperability @VLDB (SFDI) (PC)
- Software and System Modeling (SoSyM) (Journal reviewer)
- Interaction Design and Architecture(s) Journal (IxD&A) (Journal reviewer)

2019

- Software Technologies: Applications and Foundations (STAF) (Workshop Chair)
- Monitoring and Evaluation Committee at the Pôle Images & Réseaux (Member)
- International Conference on Model Driven Engineering Languages and Systems (MODELS) (PC)
- European Conference on Modelling Foundations and Applications (ECMFA) (PC)
- International Conference on Model Transformation (ICMT) (PC)
- STAF Junior Researcher Community Event (JRC) (PC)
- STAF Research Project Showcase Workshop (PC)
- Software and System Modeling (SoSyM) (Journal reviewer)
- Journal of Systems and Software (JSS) (Journal reviewer)

2018

- Monitoring and Evaluation Committee at the Pôle Images & Réseaux (Member)
- MEASURE Industrial Workshop (Keynote speaker)
- European Conference on Modelling Foundations and Applications (ECMFA) (PC, Session chair)
- International Conference on Web Engineering (ICWE) (PC)
- International Conference on Model Transformation (ICMT) (PC, Session chair)
- Transformation Tool Contest (TTC) (PC)
- Short Papers Track at the International Conference on Web Engineering (ICWE) (PC)
- Workshop on Model-Driven Engineering for Design-Runtime Interaction in Complex Systems (MDE@DeRun) (PC)
- Workshop on Models and Evolution (ME) (PC)
- Workshop on Model-Driven Requirements Engineering (MoDRE) (PC)
- Workshop on the Object Constraint Language (OCL) (PC)
- Workshop on Debugging in Model-Driven Engineering (MDEbug) (PC)
- Workshop on Executable Modeling (EXE) (PC)
- Science of Computer Programming (SciCO) (Journal reviewer)
- Software and System Modeling (SoSyM) (Journal reviewer)
- Journal of Systems and Software (JSS) (Journal reviewer)

2017

- Monitoring and Evaluation Committee at the Pôle Images & Réseaux (Member)
- Project Showcase at Software Technologies: Applications and Foundations (STAF) (Co-organizer)
- Workshop on Scalable Model-Driven Engineering (BigMDE) (Co-organizer)
- International Conference on Model Transformation (ICMT) (PC)
- International Conference on Web Engineering (ICWE) (PC)
- Tools and Demos at MoDELS Conference (MoDELS) (PC)
- Short Papers Track at the International Conference on Web Engineering (ICWE) (PC)
- Conférence en Ingénierie du Logiciel (CIEL) (PC)
- Transformation Tool Contest (TTC) (PC)
- Workshop on Model-Driven Requirements Engineering (MoDRE) (PC)
- Workshop on the Object Constraint Language (OCL) (PC)
- Workshop on Debugging in Model-Driven Engineering (MDEbug) (PC)
- Workshop on Executable Modeling (EXE) (PC)
- Science of Computer Programming (SciCO) (Journal reviewer)
- Original Software Publications in Science of Computer Programming (Journal reviewer)
- Software and System Modeling (SoSyM) (Journal reviewer)
- Journal of Systems and Software (JSS) (Journal reviewer)

2016

- Workshop on Scalable Model-Driven Engineering (BigMDE) (Co-organizer)
- International Conference on Model Transformation (ICMT) (PC)
- Industry Track for Software Language Engineering (ITSLE) (PC)
- Transformation Tool Contest (TTC) (PC)
- Tool Demonstrations at the MoDELS Conference (PC)
- Workshop on Model-Driven Requirements Engineering (MoDRE) (PC)
- Workshop on the Object Constraint Language (OCL) (PC)
- Workshop on Executable Modeling (EXE) (PC)
- Workshop on Models and Evolution (ME) (PC)
- IEEE Transactions on Software Engineering (TSE) (Journal reviewer)
- Software and System Modeling (SoSyM) (Journal reviewer)
- Science of Computer Programming (SciCO) (Journal reviewer)

2015

- Workshop on Scalable Model-Driven Engineering (BigMDE) (Co-organizer)
- International Conference on Model Transformation (ICMT) (PC)
- International Conf. on Current Trends in Theory and Practice of Computer Science (SOFSEM) (PC)
- Workshop on Model-Driven Requirements Engineering (MoDRE) (PC)
- Workshop on Executable Modeling (EXE) (PC)
- IEEE Transactions on Software Engineering (TSE) (Journal reviewer)
- Journal of Software: Evolution and Process (Journal reviewer)
- Software and System Modeling (SoSyM) (Journal reviewer)

2014

- Workshop on Scalable Model-Driven Engineering (BigMDE) (Co-organizer)
- Education of Language Engineers at SLE (Panelist)
- Model-Driven Engineering at Journées RT3 (Panelist)
- International Conference on Model Transformation (ICMT) (PC)
- International Conf. on Current Trends in Theory and Practice of Computer Science (SOFSEM) (PC)
- Industry Track for Software Language Engineering (ITSLE) (PC)
- Transformation Tool Contest (TTC) (PC)
- Journal of Logic and Algebraic Programming (JLAP) (Journal reviewer)
- NeuroComputing (Journal reviewer)
- Journal of Web Engineering (JWE) (Journal reviewer)
- European Conference on Modelling Foundations and Applications (ECMFA) (Reviewer)

2013 and before

- Workshop on Scalable Model-Driven Engineering (BigMDE) 2013 (Co-organizer)
- Workshop on Model transformations with ATL (MtATL) 2010 (Co-organizer)
- Workshop on Model transformations with ATL (MtATL) 2009 (Co-organizer)
- International Conference on Model Transformation (ICMT) 2013 (PC)
- Demos and Posters Track at the International Conference on Web Engineering 2010 (ICWE) 2010 (PC)
- IEEE Transactions on Software Engineering (TSE) (Journal reviewer)
- Science of Computer Programming (SciCO) (Journal reviewer)
- Journal of Logic and Algebraic Programming (JLAP) (Journal reviewer)
- IEEE Software (Journal reviewer)
- Journal of Systems and Software (JSS) (Journal reviewer)
- Software and System Modeling (SoSyM) (Journal reviewer)
- Software: Practice and Experience (Journal reviewer)
- Journal of Web Engineering (JWE) (Journal reviewer)
- Information Processing Letters (IPL) (Journal reviewer)
- International Conference on Model Driven Engineering Languages and Systems (MoDELS) 2010 (Reviewer)
- International Conference on Model Transformation (ICMT) 2010 (Reviewer)
- International Conference on Web Engineering (ICWE) 2010 (Reviewer)
- International Conference on Data Engineering (ICDE) 2009 (Reviewer)
- International Conference on Model Transformation (ICMT) 2009 (Reviewer)
- International Conference on Web Services (ICWS) 2009 (Reviewer)
- International World Wide Web Conference (WWW) 2008 (Reviewer)
- International Conference on Web Engineering (ICWE) 2008 (Reviewer)
- International Conference on Web Services (ICWS) 2008 (Reviewer)
- International Conference on Web Engineering (ICWE) 2008 (Reviewer)
- International Conference on Web Information Systems Engineering (WISE) 2007 (Reviewer)

5 Teaching activities

I have been responsible for the following courses and student projects at IMT Atlantique, formerly at Ecole de Mines de Nantes (a student account is required to access most of the links).

2022-2023

- Software Engineering and Modeling (FIT-A2)
- Domain-Specific Languages and Model-Driven Engineering (FIL-A3)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- Collaborative Development (FING-A1)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2021-2022

- Software Engineering and Modeling (FIT-A2)
- Domain-Specific Languages and Model-Driven Engineering (FIL-A3)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- Collaborative Development (FING-A1)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2020-2021

- Domain-Specific Languages and Model-Driven Engineering (FING-A3-GSI, FIL-A3)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- Collaborative Development (FING-A1)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2019-2020

- Domain-Specific Languages (FING-A3-GSI, FIL-A3)
- Model-Driven Engineering (FIL-A3)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- Collaborative Development (FING-A1)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2018-2019

- Domain-Specific Languages (FING-A3-GSI, FIL-A3)
- Model-Driven Engineering (FIL-A3)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- PRIME Project (FING-A1)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2017-2018

- Domain-Specific Languages (FING-A3-GSI, FIL-A3)
- Model-Driven Engineering (FIL-A3)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- PRIME Project (FING-A1)
- PIST Project (FING-A2)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2016-2017

- Domain-Specific Languages (FING-A3-GSI, FIL-A3)
- Model-Driven Engineering (FIL-A3)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- PRIME Project (FING-A1)
- PIST Project (FING-A2)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2015-2016

- Domain-Specific Languages (FING-A3-GSI, FIL-A3)
- Model-Driven Engineering (FIL-A3)
- Databases (FING-A2)
- Databases (FING-A1)
- Sensibilization to Research: MDE (FIL-A3)
- PRIME Project (FING-A1)
- PIST Project (FING-A2)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2014-2015

- Domain-Specific Languages (FING-A3-GSI, FIL-A3)
- Databases (FING-A2)
- Sensibilization to Research: MDE (FIL-A3)
- PRIME Project (FING-A1)
- IPIPIP Project (FING-A1)
- PFE Project (FING) (FING-A3)
- PFE Project (FIL) (FIL-A3)

2013-2014

- Domain-Specific Languages (FING-A3-GSI, FIL-A3)
- Databases (FING-A2)
- Sensibilization to Research: MDE (FIL-A3)
- PRIME Project (FING-A1)
- IPIPIP Project (FING-A1)
- PIST Project (FING-A2)
- PFE Project (FING-A3)
- PFE Project (FIL-A3)

2012-2013

- Databases (FING-A2)
- PRIME Project (FING-A1)
- IPIPIP Project (FING-A1)

2011-2012

- IPIPIP Project (FING-A1)

2010-2011

- Higher-order Transformations (MDE Diploma)
- IPIPIP Project (FING-A1)

2009 and before I have given lessons in the following courses at Politecnico di Milano.

- Operating Systems Project, Lecturer, 2006-2007, 2008-2009
- Technological culture, Lecturer, 2007-2008
- Software Engineering, Teaching Assistant, 2008-2009
- Web Technologies, Teaching Assitant, 2007-2008, 2008-2009
- Computer Science 3 (Algorithms and Data Structures), Teaching Assistant, 2006-2007, 2007-2008, 2008-2009
- Web Technologies, Teaching Assistant for the post-university master on Service Oriented Architectures, 2006-2007, 2007-2008
- Information Systems, Teaching Assistant for the on-line degree, 2005-2006

6 Publication list

International Journal Papers

[IJ1] Josselin Enet, Erwan Bousse, Massimo Tisi, and Gerson Sunyé. Protocol-Based Interactive Debugging for Domain-Specific Languages. *The Journal of Object Technology*, 22(2), 2023.

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