Curriculum Vitæ

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HUGO SERENO FERREIRA

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Personal Information

Full Name	Hugo José Sereno Lopes Ferreira
Birth	July 2, 1980 - Porto, Portugal
Gender	Male
Quoting Name	Hugo Sereno Ferreira (*a.k.a.* Hugo S. Ferreira, Hugo Ferreira)
Current Position(s)	Assistant Professor at Universidade do Porto - FEUP
	Research Associate at INESC TEC
Scientific Domain	Software Engineering (*Software and its engineering* per ACM CCS)
Topic(s)	Software and its engineering → Design patterns
	Software and its engineering → Model-driven software engineering
	Software and its engineering → Software creation and management
	Software and its engineering → Software architectures
	Software and its engineering → Software notations and tools
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Summary

Academic Background: 2006, *Licenciatura* in Informatics and Computing Engineering (LEIC), *Framework for Development of Command and Control Systems*, from FEUP; 2011, joint PH.D. (*w/ distinction*) in Informatics (MAPI), *Adaptive Object Modeling: Patterns, Tools and Applications*, from the Universities of Minho, Aveiro and Porto; 2011—12, **Postdoc Researcher** at INESC TEC.

Scientific Research and Development: has **34 publications** (ACM CCS: *Software and its Engineering*), 26 in conferences with scientific referee, 3 in refereed journals, and 5 others. **3 best paper awards**, and **2 invitations** for extended versions in journals. 7 are indexed in ISI WOS, 17 in SCOPUS and 11 in DBLP. Attracted over **178 citations**, resulting in a *h-index* and *i10-index* **of 8**. Participated in **4 scientific projects**, 2 national and 2 European, totaling 21M€ in funding. Reviewer in **4 journals**, **25 international conferences** and **2 books**. Involved in the organization of **11 scientific events**. Member of **24 examining committees** (1 PH.D. and 23 M.SC.), 21 as chair, and 2 in external institutions. Totals **47 supervisions**, of which 40 M.SC., 2 ongoing PH.D., 2 undergraduates, and 4 scholarships. **Research Associate** at INESC TEC. Member of the Hillside Group (which manages ★-PLOP conferences and books), and FEUP's Software Engineering Group.

Educational Activities and Experience: lecturer since 2008 of **22 different curricular units** (most in the *Software Engineering* domain) in **4 different institutions**, 19 at FEUP. Participated in the creation of **4 new curricular units** and **1 new master degree**. Member of **2 self-assessment committees** that resulted in the EUR-ACE and A3ES accreditations of MIEIC. Co-organized **5 editions of *Universidade Júnior***, head of the MIEIC student's laboratory, and ACM ICPC and IEEE trainer for competitive programming at FEUP.

Knowledge Transfer: 11 invited talks, 2 career fairs, and 3 media events. Worked in 2 military R&D projects for NATO, 3 research projects in industrial environments, and 8 development and consultancy projects. Co-founded (as CTO) ShiftForward S.A., incubated in UPTEC, successfully raised 1M€ in VC, and achieved 10M€ in valuation. Member of *Coding for Social Impact Labs*, and co-founder of *Software and Beyond* consultant, both *University of Porto* entities. Advisor for the *Founders Founders* co-working space (now part of the *ScaleUP Porto* initiative). Reviewer for Portugal Ventures' *Call on Entrepreneurship*.

Contents

1 Background

1.1 ACADEMIC DEGREES

In 2007 I was directly accepted as PHD candidate, holding just a *Licenciatura em Engenharia* (5 years), with an FCT-subsidized scholarship, due to *"outstanding professional experience"* in the field of *Software Engineering*. I was also the *first* student of the MAP-I doctoral programme to successfully complete its degree, being given the *distinction* honors by a jury of 7.

2011 **Ph.D. in Informatics, MAP-i (Joint Doctoral Programme)**
School(s): Universities of Minho, Aveiro and Porto
Title: Adaptive Object Modelling: Patterns, Tools and Applications
Supervisor: Prof. Ademar Aguiar
Co-Supervisor: Prof. João Pascoal Faria
Keywords: Meta-programming, Meta-modelling, Patterns, Software Architecture
Approved by unanimous vote, with distinction.

2006   *Licenciatura* **in Informatics and Computing Engineering (5-year degree)**
School(s): Faculty of Engineering, University of Porto
Project Title: Framework for Development of Command and Control Systems
Project Supervisor: Prof. João Correia Lopes
Project Co-Supervisor: Prof. Alexandre Sousa
Observations: The final project was done in collaboration with NATO's NC3A, a R&D military agency. The resulting document and artifacts were kept under a confidential agreement for an unspecified period.

1.2 CURRENT POSITIONS AND AFFILIATIONS

2013—   **Invited Assistant Professor**, Faculty of Engineering, University of Porto (FEUP)
Coordinates and teaches courses (§ 3.1, p. 24), mainly at the *Integrated Master in Informatics and Computing Engineering* and the newly created *Master in Software Engineering*, and supervises Ph.D and M.Sc. students (§ 2.4, p. 17).

2016—   **Research Associate**, Instituto de Engenharia de Sistemas e Computadores (INESC TEC)
Coordinates projects and supervises scientific grants.

1.3 PAST EXPERIENCE IN ACADEMY

2016   **Collaborating Professor**, Faculty of Sciences, University of Porto (FCUP)
Coordinated and taught the *Software Architecture* course with Prof. Rui Maranhão.

2013—16   **Senior Researcher**, Instituto de Engenharia de Sistemas e Computadores (INESC TEC)
Participated as a researcher in several projects, provided consultancy, and supervised junior researchers.

2008—13   **Invited Assistant Lecturer**, Faculty of Engineering, University of Porto (FEUP)
Taught several courses in various degrees (§ 3.1, p. 24), supervised Ph.D. and M.Sc. students (§ 2.4, p. 17), as well as performing several management activities.

2011—12   **Postdoctoral Researcher**, Instituto de Engª de Sistemas e Computadores (INESC TEC)
Participated as a researcher in *Ambient Assisted Living* (AAL) projects. Represented INESC in several international conferences and meetings, including at the European Comission.

2011   **External Lecturer**, Instituto Superior de Engenharia do Porto (ISEP)
Coordinated and taught the *Agile Software Methodologies* course for the *Post-Graduation in Enterprise Applications Engineering*.

2008   **Lecturer,** Instituto Superior de Tecnologias Avançadas (ISTEC)
Coordinated and taught the *Software Engineering* course for the *Degree in Informatics*.

1.4 PAST EXPERIENCE IN INDUSTRY

2011—16   **Co-Founder, Board of Directors, and Chief Technology Officer**, Shiftforward, S.A.
Originally founded as *Shiftforward, Lda.* along with Paulo Cunha, company positioned as a strategy and technology consultant, specialised in high-scalable software infrastructures for the Online Advertising industry. Due to the inherent connections with the University of Porto, we were accepted at the UPTEC incubator. Right in the first years, we gathered several international clients including, but not limited to, *Xplosion Interactive, Semasio, Wellington Partners, Eyeota, Pubmatic, AudienceScience and ClipKit*. Of special relevance to *Software Engineering*, I was directly responsible for helping them evaluate, acquire, design and/or develop the software technology for highly-decentralized, low-latency, highly-scalable systems with team sizes bigger than 100 members. Core outcomes consisted in designing *Software Architectures* and performing *Technical Due Dilligences*, which directly resulted in tens of millions of euros in funding, as well as bringing and establishing two foreign companies (*Semasio and ClipKit*) in UPTEC. In 2015, I was directly responsible for raising 1 million dollars in Venture Capital from *Portugal Ventures*, as well as other private investors. As a CTO, I conceptualized and designed several software products, with an in-house team of seven software engineers. The success of our products led to five acquisition proposals, and a current estimated valuation of 10M€. Some of our products incorporated original scientific research (§ 4.5, p. 37) and were subsequently financed by national scientific programmes.

2011   **Senior Architect**, ParadigmaXis - Arquitectura e Engenharia de Software, S.A.
Designing software system solutions in two core areas: (1) governmental, and (2) financial. Main clients included *Porto's City Hall* and *Banco Carregosa*.

2010—11   **Independent Consultant**
Provided consultancy in Software Architecture and Design, helping companies to create, evaluate and/or refactor their solutions. Main clients included *Critical Software* (PT), *Semasio* (DE), *SAGE* (PT), *Tectonic* (UK), *etc.*

2007—10   **Researcher**, ParadigmaXis - Arquitectura e Engenharia de Software, S.A.
My Ph.D. was pursued in an industrial context, were I had the opportunity to continue a direct collaboration with *ParadigmaXis*, and apply my research in their commercial projects, including *Locvs* and *GISA*.

2003—07   **Software Engineer**, ParadigmaXis - Arquitectura e Engenharia de Software, S.A.
Designed and developed solutions for military systems, geolocation applications, and information systems, eventually becoming *Team Leader*. Main clients include NATO's NC3A, *NDrive*, *Porto's City Hall*, and the *University of Porto*.

2001—03   **Freelancer**
Developed software solutions for medical healthcare (Dr. Paulo Romero) and sports centers (Ginásio Club da Maia).

1.5 GRANTS, HONORS AND AWARDS

2012   **Best paper award** for *Object-Functional Patterns: Re-Thinking Development in a Post-Functional World*, SEDES @ QUATIC 2012

2011—12   **Postdoctoral scholarship** by INESC TEC, *cf.* BPD/110054/CAALYX-MV_USIG

2007—11   **Doctoral scholarship** by FCT, *cf.* SFRH/BDE/33298/2008

2009   **Best paper award** for *Adaptive Object Modelling: Patterns, Tools and Applications*, SEDES @ ICSEA 2009

2008   **Best paper award** for *Patterns for Data and Metadata Evolution in Adaptive Object Models*, PLOP @ OOPSLA 2008

2004—11   **NATO-secret security clearance** for military R&D
In order to work in military R&D projects, NATO required a security clearance for all its internal and external personnel. This included access to a military facility located in Porto, were — besides me — only nine other people had authorization to enter. Although this period represented a recurring collaboration with NC3A, full disclosure requires appropriate credentials.

1.6 LANGUAGES

Communication competences in the following languages (self-assessment):

- **Portuguese**, as mother-tongue;
- **English**, level C2 in all skills (understanding, speaking and writing);
- **French**, level A in all skills.

2 Scientific Research and Development

2.1 SCIENTIFIC AND TECHNICAL PRODUCTION

Since 2008, I have co-authored **27 articles in conferences with scientific referee**, **2 articles in refereed journals**, and **5 other articles**. In total, these **34 publications** have attracted over **177 citations**, resulting in an **h-index and i10-index of 8**[1]. A summary of the eight most cited publications is shown in Table 2.1 (p. 6) and the complete list can be found in the following subsections. Indexed articles by the *ISI Web of Science* (7), *SCOPUS* (16) and *The DBLP Computer Science Bibliography* (11) are identified by the tags [ISI], [SCOPUS] and [DBLP] respectively. More recent articles are still waiting for proper indexation, but all ⋆-PLOP publications are indexed in SCOPUS.

2.1.1   Theses

2.   **PhD dissertation**, *Adaptive Object-Modeling: Patterns, Tools and Applications*, Faculty of Engineering, University of Porto, 2010;

1.   **Licienciatura's Project Report**, *Framework for Development of Command & Control Systems*, Faculty of Engineering, University of Porto, 2004.

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[1]   Citations and indexes were obtained by using Google Scholar, on November 21ˢᵗ 2017.

Article	Citations	Year
Patterns for consistent software documentation	25	2009
PETTool: a pattern-based GUI testing tool	24	2010
Patterns for data and metadata evolution in adaptive object-models	23	2008
Adaptive Object-Modelling: Patterns, Tools and Applications	19	2010
Incremental knowledge acquisition in software development using a weakly-typed Wiki	16	2009
Ubiquitous ambient assisted living solution to promote safer independent living in older adults suffering from co-morbidity	13	2012
Core patterns of object-oriented meta-architectures	12	2010
Smartphone based fall prevention exercises	10	2013

Table 2.1: Most cited publications, contributing to an *h*- and *i10*-index of 8.

2.1.2 Papers in periodics with scientific referee

3. João Pedro Dias, Hugo Sereno Ferreira, *Automating the Extraction of Static Content and Dynamic Behaviour from e-Commerce Websites*, Procedia Computer Science 109, pp. 297–304. Special issue for the 8th International Conference on Ambient Systems, Networks and Technologies, ANT-2017 and the 7th International Conference on Sustainable Energy Information Technology, SEIT 2017, Madeira, Portugal, 2017. [SCOPUS] { ISSN 1877-0509 } { DOI 10.1016/J.PROCS.2017.05.355 };

2. HH Nap, I Bierhoff, A Ferreiro, A Català, A Samà, C Gálvez-Barrón, A Rodríguez-Molinero, Hugo Sereno Ferreira, A Martins, M Antomarini, F Cesaroni, C Sdogati, L Carvalho, R Castro, J Spallek, *Market driven implementation of the eCAALYX solution*, Gerontechnology 11(2), 2012 { ISSN 1569-1101 } { DOI 10.4017/GT.2012.11.02.228.00 };

1. Hugo Sereno Ferreira, Ademar Aguiar, João Pascoal Faria, *Adaptive Object-Models: A Research Roadmap*, International Journal on Advances in Software 3(1&2), 2010 { ISSN 1942-2628 }.

2.1.3 Papers in conference proceedings with scientific referee

Being one of my main research topics *design and architectural patterns*, I tend to publish in *Pattern Language of Programs* conferences, mainly PLOP and EUROPLOP, the leading conferences in the topic. All ★-PLOP publications are classified as CORE B, submitted to the ACM-DL and indexed by SCOPUS, but it can take a considerable amount of time to conclude this process. Hillside, being the non-profit organization behind ★-PLOP, keeps an up-to-date digital library of published patterns in their site.

24. António Ramadas, Gil Domingues, João Pedro Dias, Ademar Aguiar and Hugo Sereno

Ferreira, *Internet of Things Patterns on Device Interaction and Reliability*, Proceedings of the 24th Conference on Pattern Languages of Programs (PLOP-2017). Vancouver, Canada, 2017. { TO APPEAR };

23. Tiago Boldt Sousa, Hugo Sereno Ferreira, Filipe Figueiredo Correia and Ademar Aguiar, *Engineering Software for the Cloud: Message Queues and Logging*, Proceedings of the 22nd European Conference on Pattern Languages of Programs (EUROPLOP-2017). Bavaria, Germany, 2017;

22. Duarte Duarte, Hugo Sereno Ferreira, João Dias and Zafeiris Kokkinogenis, *Towards a Framework for Agent-based Simulation of User Behaviour in E-Commerce Context*, Trends in Cyber-Physical Multi-Agent Systems. The PAAMS Collection — 15th International Conference on Practical Applications of Agents and Multi-Agent Systems (PAAMS-2017). Porto, Portugal, 2017. { DOI 10.1007/978-3-319-61578-3_3 };

21. Tiago Sousa, Hugo Sereno Ferreira, Filipe Correia, *Engineering Software for the Cloud: Patterns and Sequences*, Proceedings of the 11th Latin American Conference on Pattern Languages of Programs (SUGERLOAF PLOP 2016). Buenos Aires, Argentina, 2016;

20. Filipe Oliveira, Hugo Sereno Ferreira, Tiago Boldt Sousa, *Exploring the Scala Macro System for Compile Time Model-Based Generation of Statically Type-Safe REST Services*, Proceedings of the 2nd International Conference on Advances and Trends in Software Engineering (SOFTENG-2016). Lisbon, Portugal, 2016. ⋆ INVITED FOR EXTENDED VERSION IN JOURNAL ⋆ { ISBN 978-1-61208-458-9 };

19. Tiago Boldt Sousa, Filipe Correira, Hugo Sereno Ferreira, *DevOps patterns for software orchestration on public and private clouds*, Proceedings of the 22nd Conference on Pattern Languages of Programs (PLOP-2015). Pittsburgh, Pennsylvania, USA, 2015;

18. Omar Castro, Hugo Sereno Ferreira, Tiago Boldt Sousa, *Collaborative Web Platform for UNIX-based Big Data Processing*, Proceedings of the 11th International Conference on Cooperative Design, Visualization and Engineering (CDVE-2014). Seattle, USA. Lecture Notes in Computer Science 8683, 2014. [ISI, DBLP, SCOPUS] { DOI 10.1007/978-3-319-10831-5_30 };

17. Nuno Flores, Ademar Aguiar, Hugo Sereno Ferreira, *The Concept of Ba Applied to Software Knowledge*, Proceedings of the 7th International Workshop on Cooperative and Human Aspects of Software Engineering (CHASE 2014), Hyderabad, India, 2014. [DBLP, SCOPUS] { DOI 10.1145/2593702.2593713 };

16. Bruno Ferreira, Vânia Guimarães, Hugo Sereno Ferreira, *Smartphone Based Fall Prevention Exercises*, Proceedings of the 15th IEEE International Conferences on e-Health Networking, Application & Services (HEALTHCOM 2013). Lisbon, Portugal, 2013. [DBLP, SCOPUS] { DOI 10.1109/HEALTHCOM.2013.6720755 };

15. Tiago Boldt Sousa, Hugo Sereno Ferreira, *Object-Functional Patterns: Re-Thinking Development in a Post-Functional World*, Proceedings of the 8th International Conference on the Quality of Information and Communications Technology (SEDES-2012). Lisbon, Portugal, 2012. ⋆ BEST PAPER AWARD ⋆ [ISI, DBLP, SCOPUS] { DOI 10.1109/QUATIC.2012.43 };

14. Sandra Prescher, Alan Bourke, Friedrich Koehler, Angelo Manuel Martins, Hugo Sereno Ferreira, Tiago Boldt Sousa, Rui Castro, António Santos, Marc Torrent Poch, Sergi Gomis Gascó, Hospedales Margarita, John Nelson, *A Ubiquitous Ambient Assisted Living Solution to Promote Safer Independent Living in Older Adults Suffering from Co-morbidity*, Proceedings of the 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC-2012). California, USA, 2012. [ISI, SCOPUS] { ISSN 1558-4615 } { DOI 10.1109/EMBC.2012.6347145 };

13. Hugo Sereno Ferreira, Tiago Sousa, Angelo Martins, *Scalable Integration of Multiple Health Sensor Data for Observing Medical Patterns*, Proceedings of the 9th International Conference on Cooperative Design, Visualization and Engineering (CDVE-2012). Osaka, Japan. Lecture Notes in Computer Science 7467, 2012. [ISI, DBLP, SCOPUS] { DOI 10.1007/978-3-642-32609-7_11 };

12. Tiago Almeida, Hugo Sereno Ferreira, Tiago Sousa, *A collaborative expandable framework for end-users and programmers*, Proceedings of the 9th International Conference on Cooperative Design, Visualization and Engineering (CDVE-2012). Osaka, Japan. Lecture Notes in Computer Science 7467, 2012. [ISI, DBLP, SCOPUS] { DOI 10.1007/978-3-642-32609-7_22 };

11. Patricia Matsumoto, Eduardo Guerra, Hugo Sereno Ferreira, Filipe Correia, Joseph Yoder, Ademar Aguiar, *AOM metadata extension points*, Proceedings of the 18th Conference on Pattern Languages of Programs (PLOP-2011). Oregon, USA, 2011. [DBLP, SCOPUS] { DOI 10.1145/2578903.2579150 };

10. Hugo Sereno Ferreira, Filipe Correia, Ademar Aguiar, Joseph Yoder, *The Lazy Semantics Pattern on the context of Meta-Architectures*, 2nd Asian Conference on Pattern Languages of Programs (ASIANPLOP-2011). Tokyo, Japan, 2011;

9. Hugo Sereno Ferreira, Filipe Correia, Joseph Yoder, Ademar Aguiar, *Core Patterns of Object-Oriented Meta-Architectures*, Proceedings of the 17th Conference on Pattern Languages of Programs (PLOP-2010). Nevada, USA, 2010. [DBLP, SCOPUS] { DOI 10.1145/2493288.2493290 };

8. Marco Cunha, Ana Paiva, Hugo Sereno Ferreira, Rui Abreu, *PETTool: A Pattern-Based GUI Testing Tool*, 2nd International Conference on Software Technology and Engineering (ISCTE-2010). Puerto Rico, USA, 2010. [SCOPUS] { DOI 10.1109/ICSTE.2010.5608882 };

7. Gabriela Soares, Rosaldo Rossetti, Nuno Flores, Ademar Aguiar, Hugo Sereno Ferreira, *A Cooperative Personal Agenda in a Collaborative Team Environment*, Proceedings

of the 6ᵗʰ International Conference on Cooperative Design, Visualization and Engineering (CDVE-2009). Lecture Notes in Computer Science 5738, 2009. [ISI, DBLP, SCOPUS] { DOI 10.1007/978-3-642-04265-2_28 };

6. António Rito Silva, David Martinho, Ademar Aguiar, Nuno Flores, Filipe Correia, Hugo Sereno Ferreira, *An Implementation Model for Agile Business Process Tools*, 1ˢᵗ International Workshop on Organizational Design and Engineering (IWODE09), Portugal, 2009;

5. Hugo Sereno Ferreira, Filipe Correia, Ademar Aguiar, *Design for an Adaptive Object-Model Framework: An Overview*, Proceedings of the 4ᵗʰ International Workshop on Models@runtime, Denver, Colorado, USA, 2009. [SCOPUS] { ISSN 16130073 };

4. Filipe Correia, Hugo Sereno Ferreira, Nuno Flores, Ademar Aguiar, *Patterns for Consistent Software Documentation*, Proceedings of the 16ᵗʰ Conference on Pattern Languages of Programs (PLOP-2009). Chicago, Illinois, USA, 2009. [SCOPUS] { DOI 10.1145/1943226.1943241 };

3. Filipe Correia, Hugo Sereno Ferreira, Nuno Flores, Ademar Aguiar, *Incremental Knowledge Acquisition in Software Development Using a Weakly-Typed Wiki*, Proceedings of the 5ᵗʰ International Symposium on Wikis and Open Collaboration, Orlando, Florida, USA, 2009. [SCOPUS, DBLP] { DOI 10.1145/1641309.1641352 };

2. Hugo Sereno Ferreira, Ademar Aguiar, João Pascoal Faria, *Adaptive Object Modelling: Patterns, Tools and Applications*, Proceedings of the 4ᵗʰ International Conference on Software Engineering Advances, Porto, Portugal, 2009. ⋆ BEST PAPER AWARD ⋆ [ISI, DBLP, SCOPUS] { DOI 10.1109/ICSEA.2009.83 };

1. Hugo Sereno Ferreira, Filipe Correia, Leon Welicki, *Patterns for Data and Metadata Evolution in Adaptive Object Models*, Proceedings of 15ᵗʰ Conference on Pattern Languages of Programs (PLOP-2008). Nashville, Tennessee, USA, 2008. ⋆ BEST PAPER AWARD ⋆ [SCOPUS] { DOI 10.1145/1753196.1753203 }.

2.1.4 Papers in national conference proceedings with scientific referee

2. Luís Fonseca, Tiago Boldt Sousa, Hugo Sereno Ferreira, *Rapid Prototyping and Development Framework for Android with Scala*, Proceedings of the 6ᵗʰ Symposium on Informatics (INFORUM 2014). Porto, Portugal, 2014 { ISBN 978-972-752-171-5 };

1. Filipe Correia and Hugo Sereno Ferreira, *Trends on Adaptive Object-Model Research*, Proceedings of the 3ʳᵈ Edition of the Doctoral Symposium in Informatics Engineering, Porto, Portugal, 2008.

2.1.5   Other scientific production

5.   João Pedro Dias, Hugo Sereno Ferreira, *Automating the Extraction of Static Content and Dynamic Behaviour from e-Commerce Websites*, 10ª Edição Encontro Investigação Jovem (IJUP-2017). Porto, Portugal, 2017;

4.   João Silva, Hugo Sereno Ferreira, *Bluetooth Based Warning System for Ambient Assisted Living*, 9ª Edição Encontro Investigação Jovem (IJUP-2016). Porto, Portugal, 2016;

3.   Filipe Correia, Nuno Flores, Hugo Sereno Ferreira, Ademar Aguiar, *Assessing Tools for Software Development: An overview of three user evaluations*, User evaluation for Software Engineering Researchers (USER) Workshop at the 34th International Conference on Software Engineering, 2012;

2.   Hugo Sereno Ferreira, *Introdução à Programação Objecto-Funcional com Scala*, MundoJ Magazine, Issue 53, 2012;

1.   Michel Wermelinger, Hugo Sereno Ferreira, *Quality evolution track at QUATIC'10*, ACM SIGSOFT Software Engineering Notes, Volume 36, Issue 1, p.   28—29, 2011 { DOI 10.1145/1921532.1960273 }.

2.2 SCIENTIFIC PROJECTS

I have participated in a total of **4 scientific projects**, funded by national (2) and European (2) R&D agencies and programmes. I have also participated in **2 military R&D projects** (§ 4.4, p. 37) and **2 projects funded by SIFIDE** (§ 4.5, p. 37)[2].

2.2.1   Research Projects

In every project mentioned, my main contribution was that of an expert in *Software Architecture*, by having the responsibility on tackling all the software quality attributes associated with a *scalable solution*. I also performed supervision of researchers in all four projects.

4.   **NanoSTIMA - Macro-to-Nano Human Sensing: Towards Integrated Multimodal Health Monitoring and Analytics (Research Line 3)**
Since January 2017. *Senior Researcher*, INESC TEC, 5.9M€ *cf.* NORTE-01-0145-FEDER-000016
The increasing need to care for the aging, the chronically ill, the sick, the victim of an emergency, the health conscious or just the sporting addicts, point to the need of similarly increase in collaboration of informatics and healthcare for dealing with all the cases and

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[2]   Although these projects received public funding, and were classified as *Research*, their industrial context is perhaps more suitably justified as *Knowledge Transfer*.

handling the deluge of data. The proliferation and availability of health devices for collecting vital signs and the gain that there is in collecting as much information as possible drives this increase in data collection. A good example of this approach is the investment in user-specific medication, and the emerging user-centred medicine, which is the focus on this project. Research Line 3 responsibility is for devising the infrastructure needed to manage health data, and thus is highly centered on *Software Architecture*. Although I joined this project very recently, I am now a supervisor of researcher and Ph.D. candidate Eng. João Pedro Dias; our work begun immediately, and in just a few months we already have a working prototype and submitted articles that put INESC well ahead of its goals.

3.   **AAL4All: Ambient Assisted Living for All**
2011 — 14. *Senior Researcher*, INESC PORTO, 8.18M€ *cf.* QREN 13852
A mobilizing project for an industrial ecosystem of products and services in the scope of Ambient Assisted Living (AAL), focused on the definition of specific standards, together with a business model, and validated through large scale trials. My main contributions focused on defining the architectural infrastructure, both from a logical and physical point of view, and pushing the system's communication mechanisms to lie upon a Content-Agnostic Message-oriented Middleware (MOM); not only that decision prevailed, but nowadays, with the explosion of the Internet of Things, we can observe that MOMs are indeed a pervasive and proven good solution.

2.   **CAALYX-MV: Complete AAL Market Validation**
2011 — 13. *PostDoctoral Researcher*, INESC PORTO, 3.91M€ *cf.* ICT-PSP 09-3-250577
An European project to widely validate an innovative and efficient ICT-based solution focused on improving the quality of life of the elderly through wearable light devices. As an evolution of eCAALYX, I represented INESC in several EU meetings with both our international partners, as well as EU reviewers, as well as helped to design large-scale trials.

1.   **eCAALYX: Enhanced AAL**
2011 — 12. *PostDoctoral Researcher*, INESC PORTO, 2.7M€ *cf.* AAL-010000 09-13
Three-year project funded by the European Commission under the AAL Joint Programme (Strategic Objectives addressed: ICT-based Solutions for Prevention and Management of Chronic Conditions of Elderly People). The project builds on the strengths of the infrastructure and functionality already developed in the original CAALYX project. I was mainly responsible for the acquisition of signals in a *Personal Area Network* through a combination of mobile and fixed *gateways*. I also participated in the design of clinical trials, as well as in devising a scalable mechanism for detecting medical patterns, both resulting in publications.

2.3 INVOLVEMENT IN SCIENTIFIC COMMUNITIES

Since 2008, I have participated as a reviewer in **4 journals**, **25 international conferences** (out of which **6 in ⋆-PLoP**), and **2 books**. Along with the **24 examining comittees** and **11 organizations** of scientific events, it totals **66 interventions** in scientific and professional *Software Engineering* communities, averaging **6.6 per year**.

2.3.1   Reviewer for international scientific journals

4.   **Journal of Software Engineering Research and Development**, Springer. 2017;

3.   **Pervasive and Mobile Computing Journal** (Impact Factor 2.4), Elsevier. 2016;

2.   **IEEE Transactions on Software Engineering** (Impact Factor 2.3), IEEE TSM. 2012;

1.   **IEEE Software** (Impact Factor 0.8). 2011.

2.3.2   Reviewer in ⋆-PLoP conferences

The *Pattern Languages of Programs* conference series have a long reviewing process more akin to a journal, where the reviewer sends its comments to the author, and the author is allowed to evolve the paper in iterative steps, before a decision of acceptance is made. Even after the paper is accepted, the author must attend an on-site *Writer's Workshop* — basically another peer-review system — before attaining a final, *camera-ready*, version. Notwithstanding *program committee membership* (§ 2.3.3, p. 12), the following are the list of revisions I participated for ⋆-PLOP:

6.   22nd European Conference on Pattern Languages of Programs (EUROPLOP 2017);

5.   18th European Conference on Pattern Languages of Programs (EUROPLOP 2013);

4.   19th Conference on Pattern Languages of Programs (PLOP 2012);

3.   16th European Conference on Pattern Languages of Programs (EUROPLOP 2011);

2.   17th Conference on Pattern Languages of Programs (PLOP 2010);

1.   15th European Conference on Pattern Languages of Programs (EUROPLOP 2010).

2.3.3   Member of committees of international conferences

19.   19th International Conference on Agile Software Development (XP 2018);

18.   8th Agile Portugal (APT 2017);

17.   8th Brazilian Workshop on Agile Methods (WBMA @ AGILE BRAZIL 2017);

16.   7th Brazilian Workshop on Agile Methods (WBMA @ AGILE BRAZIL 2016);

15.   6ᵗʰ Brazilian Workshop on Agile Methods (WBMA @ AGILE BRAZIL 2015);

14.   10ᵗʰ Latin-American Conf. on Pattern Languages of Prog. (SUGARLOAFPLOP 2014);

13.   Software Engineering and Science track at the 6ᵗʰ Symposium on Informatics. (SOFT-PT @ INFORUM 2014);

12.   9ᵗʰ Int. Conf. on the Quality of Information and Communications Tech. (QUATIC 2014);

11.   Workshop of Agile Software Development Techniques at the 14ᵗʰ International Conference on Computational Science and its Applications (ICCSA 2014);

10.   5ᵗʰ Int. Workshop on Flexible Modeling Tools (FLEXITOOLS @ SPLASH 2013);

9.   MiniPLoP Brasil IME/USP. 2013;

8.   Wavefront Experience at the 4ᵗʰ annual SPLASH conference. 2013;

7.   8ᵗʰ Int. Conf. on the Quality of Information and Communications Tech. (QUATIC 2012);

6.   Doctoral Symposium in Informatics Engineering (DSIE 2012);

5.   2ⁿᵈ International Summer School on Domain Specific Modeling. 2011;

4.   18ᵗʰ Conference on Pattern Languages of Programs (PLOP 2011);

3.   Model Driven Engineering (ECM/MDE, INFORUM 2011);

2.   MiniPLoP Brasil IME/USP. 2011;

1.   6ᵗʰ Int. Conf. on the Quality of Information and Communications Tech. (QUATIC 2010).

2.3.4   Conference organization

Besides being part of the aforementioned *program committees* (§ 2.3.3, p. 12), I have also participated in the organization of **10 scientific events**, out of which **4 programming marathons**[3] and **2 as a student volunteer.**

11.   **Steering Committee** 6ᵗʰ Edition of the Student Organized Tech Conference (TALK-A-BIT 2018). Porto, Portugal;

10.   **Scientific Committee** of the Inter-University Programming Marathon (MIUP 2017). University of Minho, Braga, Portugal;

9.   **Scientific Committee** of the Inter-University Programming Marathon (MIUP 2016). Faculty of Science and Technology, University of Lisbon, Portugal;

8.   **Scientific Committee** of the Inter-University Programming Marathon (MIUP 2015). Faculty of Sciences, University of Porto, Portugal;

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[3]   The Inter-University Programming Marathon (MIUP) are university programming contests done for the purpose of selecting the best candidates to participate in the ACM ICPC.

7. **Chair** of the Inter-University Programming Marathon (MIUP 2014). Faculty of Engineering, University of Porto, Portugal;

6. **Co-Chair** of the 3rd Agile Portugal. Faculty of Engineering, University of Porto. 2012;

5. **Co-Chair** of the 2nd Agile Portugal. Faculty of Engineering, University of Porto. 2011;

4. **Co-Chair** of the 1st Agile Portugal. Faculty of Engineering, University of Porto. 2010;

3. **Co-Organizing Chair** of the Quality Evolution in ICT Track of the 7th International Conference on the Quality of Information and Communications Technology (QUATIC 2010). Faculty of Engineering, University of Porto, Portugal;

2. **Student Volunteer** at the 23rd Annual ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2008), Nashville, Tennessee, USA;

1. **Student Volunteer** at the 15th Conference on Pattern Languages of Programs (PLOP 2008), Nashville, Tennessee, USA.

2.3.5   Technical Reviews (Books)

The following are *technical reviews* of books published by worldwide popular editors in Informatics and Computer Science books. Technical reviews are made while the book is still being written, usually by receiving individual chapters as they are being draft, and provides a way to give technical feedback to the author and participate in the shaping of the book[4].

2. **Duncan K. DeVore, Sean Walsh, and Brian Hanafee**, *Reactive Application Development*, Manning Publications Co. 2015;

1. **Alvin Alexander**, *Scala Cookbook*, O'Reilly Media, Inc. 2013.

2.3.6   Degree-awarding Committees

Since 2011, I have participated in **27 examining comittees**, out of which **21 as chair**, **26 M.Sc.** and **1 Ph.D.**, averaging **3.9 examinations per year**, excluding direct supervisions as later detailed (§ 2.4, p. 17):

27. **Examiner**. Henrique Sobral, *Desenvolvimento de uma aplicação web sobre a história dum clube de futebol*. Supervisor: Prof. João Miguel Fernandes. Master in Informatics Engineering. University of Minho. 2017;

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[4] In January 2016 I received an invitation from *Manning Publications* to join as main author of the book *Reactive Application Development*, due to the ongoing quality of my technical reviews. Unfortunately, their intended tight schedule, and the fact the book was already well under way, lead me to decline. The editor was more than welcome to assess a new book proposal if I was so inclined in the future.

26. **Examiner**. José Alves, *Desenvolvimento de uma aplicação de gestão comercial*. Supervisor: Prof. João Miguel Fernandes. Master in Informatics Engineering. University of Minho. 2017;

25. **Examiner**. Sérgio Morais Duarte, *Desenvolvimento de um Sistema de Software de Suporte ao Total Cost of Ownership*. Supervisor: Prof. Paulo Pereira Afonso. Master in Systems' Engineering. University of Minho. 2017;

24. **Chair**. Diogo Barroso, *Enhancing Game-Based Software Project Estimation Learning with Personality Traits*. Supervisor: Prof. Nuno Flores. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017;

23. **Chair**. João Gouveia, *Serious Game for Learning About Software Architecture and Design*. Supervisor: Prof. Nuno Flores. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017. { HDL.HANDLE.NET/10216/106596 };

22. **Chair**. Rodolfo Rodrigues, *Tools and Processes for Enhanced Product Customization*. Supervisor: Prof. Nuno Flores. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017. { HDL.HANDLE.NET/10216/106501 };

21. **Chair**. Bruno Gonçalves, *FEUPPooling: Carpooling Platform*. Supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017. { HDL.HANDLE.NET/10216/106164 };

20. **Chair**. Diogo Ferreira, *Weaki Desktop App: A Tool for Agile Software Documentation*. Supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017;

19. **Chair**. Eduardo Almeida, *Quantified Self for Developers*. Supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017. { HDL.HANDLE.NET/10216/105461 };

18. **Chair**. João Guilherme Oliveira, *Workflow engine for parallel batch processing*. Supervisor: Prof. João Pascoal Faria. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017. { HDL.HANDLE.NET/10216/102704 };

17. **Chair**. Pedro Dias Faria, *Test Automation in Continuous Integration for Hardware Validation*. Supervisor: Prof. Rui Maranhão. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017. { HDL.HANDLE.NET/10216/102620 };

16. **Examiner**. Rúben Barros, *DevOps Technologies for Tomorrow*. Supervisor: Prof. Angelo Martins. Polytechnic of Porto - School of Engineering (ISEP). 2016;

15. **Chair**. Luís Carlos Amaro, *Webprocesspair: Recommendation System of Improvement Actions*. Supervisor: Prof. João Pascoal Faria. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2016. { HDL.HANDLE.NET/10216/85826 };

14. **Chair**. Tiago Coelho, *Automação de Testes de Aplicações Móveis sem Necessidade de Programação*. Supervisor: Prof. João Pascoal Faria. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2016. { HDL.HANDLE.NET/10216/85797 };

13. **Chair**. Vasco Gomes, *Improving Courses Management by Predicting Number of Students*. Supervisor: Prof. João Mendes Moreira. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2016. { HDL.HANDLE.NET/10216/88992 };

12. **Examiner**. Carlos Miguel Caldas, *anoBusiness - ferramenta de BPM*. Supervisor: Prof. Pedro Ribeiro. Integrated Master in Network and Information Systems Engineering. Faculty of Sciences, University of Porto (FCUP). 2015. { HDL.HANDLE.NET/10216/83451 };

11. **Chair**. Jorge Costa, *A Multi-Objective Approach to Test Suite Reduction*. Supervisor: Prof. Rui Maranhão. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015. { HDL.HANDLE.NET/10216/83523 };

10. **Chair**. Paulo Freitas, *Software Repository Mining Analytics to Estimate Software Component Reliability*. Supervisor: Prof. Rui Maranhão. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015. { HDL.HANDLE.NET/10216/89450 };

9. **Chair**. Daniela Cardeano, *Data Mining em aplicações de Desenho Racional de Fármacos*. Supervisor: Prof. Rui Camacho. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2014. { HDL.HANDLE.NET/10216/102940 };

8. **Chair**. Tiago Mota, *Identificação e Quantificação de Células Oncocíticas em Imagens Microscópicas*. Supervisor: Prof. Rui Camacho. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2014. { HDL.HANDLE.NET/10216/74376 };

7. **Chair**. João Ponte, *Deteção de falhas em Servidores de Video on Demand*. Supervisor: Prof. João Mendes Moreira. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2014. { HDL.HANDLE.NET/10216/73480 };

6. **Chair**. Bruno Salgado Fernandes, *Improving Software Project Estimates Based on Historical Data*. Supervisor: Prof. João Pascoal Faria. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2014. { HDL.HANDLE.NET/10216/89041 };

5. **Chair**. Linda Padilla, *Transformation of Business Process Models: A Case Study*. Supervisor: Prof. João Pascoal Faria. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2014. { HDL.HANDLE.NET/10216/71755 };

4. **Examiner**. Fernando Sérgio Barbosa, *Generic Roles: Reducing Code Replication*. Supervisor: Prof. Ademar Aguiar. Doctoral Programme in Informatics (PRODEI). Faculty of Engineering, University of Porto (FEUP). 2013. { HDL.HANDLE.NET/10216/68901 };

3. **Chair**. Angela Igreja, *AngelMail: uma solução integrada de priorização, visualização e organização de email*. Supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2013. { HDL.HANDLE.NET/10216/90050 };

2. **Chair**. Tiago Carvalho, *A Meta-Language and Framework for Aspect-Oriented Programming*. Supervisor: Prof. João Paiva Cardoso. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2011. { HDL.HANDLE.NET/10216/63339 };

1. **Chair**. João Martinho Antunes, *Desenvolvimento e integração de editores gráficos de elevado impacto visual*. Supervisor: Prof. António Magalhães. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2011. { HDL.HANDLE.NET/10216/66386 }.

2.4 SCIENTIFIC SUPERVISION OF INDIVIDUALS AND TEAMS

Since 2009, I have been (co-)supervisor of **40 M.Sc.** dissertations (§ 2.4.3, p. 18), **2 Ph.D.** thesis (§ 2.4.2, p. 18), **2 undergraduate** projects (§ 2.4.4, p. 23) and **4 scholarships** (§ 2.4.1, p. 17), totaling **47 supervisions** and averaging at **5.2 supervisions per year** for the past 9 years. Further breakdown can be found in Table 2.2 (p. 18) and Table 2.3 (p. 19).

2.4.1   Supervision of Researchers

The following represent researchers which I have supervised *w.r.t.* the identified scholarships, notwithstanding their respective Ph.D. and M.Sc. studies:

4. **Luís Brochado Reis**, Research grant at INESC TEC. Initial duration: 8mo, renewable. Project: *NanoSTIMA Research Line 3-2, cf. NC2017-0250*. 2017;

	ONGOING (CO-)	FINISHED (CO-)	TOTAL (CO-)
UNDERGRADUATE	—	2 (2)	2 (2)
M.SC.	14 (3)	26 (4)	40 (7)
PH.D.	2	—	2
SCHOLARSHIPS	1+1	2	3+1
TOTAL	17 (3)	30 (6)	47 (9)

Table 2.2: Detailed summary of type of supervision from 2009 until now. Numbers inside parenthesis represent co-supervisions. There's one scholarship that coincides with a Ph.D. student, so it appears as a (+1).

3. **João Pedro Dias**, Research grant at INESC TEC. Initial duration: 12mo, renewable. Project: *NanoSTIMA Research Line 3-2, cf. AE2017-0051*. 2017;

2. **Tiago Boldt Sousa**, Research grant at INESC TEC. Initial duration: 18mo, renewable. Project: *Ambient Assisted Living for All*. 2012—2015;

1. **Luís Fonseca**, Scientific Initiation grant at INESC TEC. Duration: 6mo. *Object-Functional Pattern Variants of AOMs*. 2012.

2.4.2   Supervision of Doctoral Students

2. **João Pedro Dias**, *Towards a Reference Architecture for Orchestrating Large-Scale Internet of Things' Systems using Visual Programming Languages*. Main Scientific Area: *Software Engineering*. Doctoral Programme in Informatics (PRODEI), Faculty of Engineering, University of Porto. 2017—2020 (*Expected*);

1. **Tiago Boldt Sousa**, *Design Patterns for Cloud Computing: An Empirical Research*. Main Scientific Area: *Software Engineering*. Co-supervisor: Prof. Filipe Correia. Doctoral Programme in Informatics (PRODEI), Faculty of Engineering, University of Porto. 2011—2018 (*Expected*).

2.4.3   Supervision of Master and Integrated Master Students

40. **André Lago**, *Exploring Complex Event Management in a Smart-Space Environment through a Conversational-Based Approach*. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

DEGREE	INSTITUTION	ONGOING (CO-)	FINISHED (CO-)	TOTAL (CO-)
MIEIC	FEUP	10 (1)	25 (4)	35 (5)
MESW	FEUP	4 (2)	—	4 (2)
MIEEC	FEUP	—	1	1
TOTAL	—	14 (3)	26 (4)	40 (7)

Table 2.3: Detailed summary of M.Sc. supervisions since 2009. Numbers inside parenthesis represent co-supervisions.

39. **Flávio Couto**, *Framework for Multi-Agent Smart-Space Simulator.* Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

38. **Guilherme Pinto**, *Exploring Blockchain as an Authentication and Security Method for IoT.* Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

37. **António Ramadas**, *Unsupervised, Online and/or Reinforced Learning of User Patterns and Interactions in Smart-Spaces.* Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

36. **João Bernardino**, *Bio-Measurements Estimation and Support in Knee Recovery through Machine Learning.* Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

35. **Duarte Pinto**, *Serverless Architectural design for IoT.* Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

34. **Gil Domingues**, *A Software Repository for Live Software Development Environments.* Main supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

33. **Leonardo Machado**, *Non-Biased Methods Framework for Assessing the Impact of Day-to-Day Behavioural Patterns.* Master in Software Engineering (MESW). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

32. **Marco Rodrigues**, *An Engineering Approach to Digital Analytics.* Master in Software Engineering (MESW). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

31. **Pedro Lourenço**, *Towards a Live Management of Cloud Infrastructures.* Main supervisor:

Prof. Ademar Aguiar. Master in Software Engineering (MESW). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

30. **Nuno Barros**, *Towards a Live Development of IoT Systems*. Main supervisor: Prof. Ademar Aguiar. Master in Software Engineering (MESW). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

29. **Rui Figueira**, *Data ingestion framework using Spark Streaming* at FARFETCH. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

28. **João Cardoso**, IM2HoT: *Interactive Machine-Learning to improve the House of Things*. Co-Supervisor: Prof. Luis Teixeira. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Expected*);

27. **André Humberto Morais**, 2HoT4All: *Highly-scalable House of Things for All*. Co-Supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18 (*Suspended*);

26. **Henrique Ferrolho**, *Whole-body end-pose planning on uneven and inclined surfaces* at UNIVERSITY OF EDINBURGH. Main supervisor: Prof. Rosaldo Rossetti and Prof. Sethu Vijayakumar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2016—17. { HDL.HANDLE.NET/10216/105951 };

25. **Maria João Miranda**, *Exploring Visual Programming Patterns from the End-User Perspective*. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2016—17 (*Suspended*);

24. **Carlos Teixeira**, *Towards DevOps: Practices and Patterns from the Portuguese Startup Scene*. Co-Supervisor: Eng. Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015—16. { HDL.HANDLE.NET/10216/85711 };

23. **Gabriel Candal**, *Exploring Visual Programming Concepts for Probabilistic Programming Languages*. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015—16. { HDL.HANDLE.NET/10216/85704 };

22. **Pedro Fernandes**, *Framework for Monte Carlo Tree Search-related strategies in Competitive Card Based Games*. Co-supervisor: Eng. Ivo Timóteo, University of Cambridge. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015—16. { HDL.HANDLE.NET/10216/85713 };

21. **Duarte Nuno Duarte**, *Framework for Multi-Agent Simulation of User Behavior in E-Commerce Sites*. Co-supervisor: Eng. João Azevedo. Integrated Master in Informatics and

Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015—16. { HDL.HANDLE.NET/10216/85507 };

20. **João Pedro Dias**, *Reverse Engineering Static Content and Dynamic Behaviour of E-Commerce Sites for Fun and Profit*. Co-supervisor: Eng. Rui Gonçalves. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015—16. { HDL.HANDLE.NET/10216/85374 };

19. **André Silva**, *Email clustering and classification: A Case Study* at MAILCUBE. Main supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2015—16. { HDL.HANDLE.NET/10216/88362 };

18. **Filipe Oliveira**, *Exploring the Scala Macro System for Compile Time Model-Based Generation of Statically Type-Safe REST Services*. Co-supervisor: Eng. Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2014—15. { HDL.HANDLE.NET/10216/83537 };

17. **João Silva**, *Bluetooth based Warning System for Ambient Assisted Living* at Fraunhofer AICOS. Co-supervisors: Eng. Manuel Monteiro, and Eng. Filipe Sousa. Integrated Master in Electrical and Computer Engineering (MIEEC). Faculty of Engineering, University of Porto (FEUP). 2014—15. { HDL.HANDLE.NET/10216/79567 };

16. **Luís Fonseca**, *Exploring Rapid Application Development for Android with Scala and SBT* at INESC TEC. Co-supervisor: Eng. Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2013—14. { HDL.HANDLE.NET/10216/75085 };

15. **Bruno Maia**, *Transformation Patterns for a Reactive application* at BLIP. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2013—14. { HDL.HANDLE.NET/10216/98156 };

14. **Omar Castro**, *Shellhive: Towards a Collaborative Visual Programming Language for UNIX Workflows*. Co-supervisor: Eng. Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2013—14. { HDL.HANDLE.NET/10216/75534 };

13. **Pedro Borges**, *Online Advertising: Forecasting and Synthesising Web Activity Based On Historical Data* at SHIFTFORWARD. Main supervisor: Prof. João Mendes Moreira. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2013 — 14. { HDL.HANDLE.NET/10216/73583 };

12. **Jorge Silva**, *The Road to Enlightenment: Generating Insight and Predicting Consumer Actions in Digital Markets* at SHIFTFORWARD. Co-supervisors: Prof. João Mendes Moreira and Eng. Rui Gonçalves. Integrated Master in Informatics and Computation

Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2013—14. { HDL.HANDLE.NET/10216/73263 };

11. **João Quarteu**, *Towards a self-managed framework for orchestration and integration of devices in AAL* at INESC TEC. Co-supervisor: Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2013—14. { HDL.HANDLE.NET/10216/72504 };

10. **João Figueiredo**, *Modularization of Large Web Applications* at BLIP. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2012—13. { HDL.HANDLE.NET/10216/102190 };

9. **Carlos Babo**, *Generic and Parameterizable Service for Remote Configuration of Mobile Phones Using Near Field Communication* at Fraunhofer AICOS. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2012—13. { HDL.HANDLE.NET/10216/68444 };

8. **Bruno Ferreira**, *Smartphone Based Fall Prevention Exercises* at Fraunhofer AICOS. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2012—13. { HDL.HANDLE.NET/10216/68726 };

7. **Vasco Grilo**, *Exploring the flexibility of Scala's Implicits towards an Extensible Live Environment*. Co-supervisor: Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2012—13. { HDL.HANDLE.NET/10216/66919 };

6. **Tiago Almeida**, *End-User Programming In Mobile Devices through Reusuable Visual Components Composition*. Co-supervisor: Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2011—12. { HDL.HANDLE.NET/10216/65656 };

5. **Jorge Mateus**, *Agile Business Intelligence Using Microsoft® SharePoint* at CRITICAL MANUFACTURING. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2011—12;

4. **Inês Carvalho**, *Espresso Medical Systems* at SCIONIS. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2011—12;

3. **André Carmo**, *Introducing End-User Reconfiguration on Clinical Knowledge Information Systems* at CRITICAL SOFTWARE, S.A. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2010—11. { HDL.HANDLE.NET/10216/63433 };

2. **Marcelo Cerqueira**, *Ambiente de Modelação e Configuração de Processos* at SIEMENS S.A. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2010—11. { HDL.HANDLE.NET/10216/61587 }.

1. **João Gradim Pereira**, *Improving Variability of Applications using Adaptive Object-Models* at TECLA COLORIDA. Main supervisor: Prof. Ademar Aguiar. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2009—10. { HDL.HANDLE.NET/10216/62128 }.

2.4.4   Supervision of Undergraduate Students

The following were undergraduate researchers that pursued their final *Licenciatura* project at INESC, and were under my co-supervision:

2. **Diogo Silva**, *Desenvolvimento de Aplicação Android para Monitorização de Idosos* at INESC. Main supervisor: Prof. Angelo Martins. *Licenciatura* in Informatics Engineering. Polytechnic of Porto - School of Engineering (ISEP). 2012;

1. **Vítor Moreira**, *Desenvolvimento de Aplicação Android para Monitorização de Idosos* at INESC. Main supervisor: Prof. Angelo Martins. *Licenciatura* in Informatics Engineering. Polytechnic of Porto - School of Engineering (ISEP). 2012.

2.4.5   Scientific Affiliations

2. **Member** of the *International Hillside Group*, an educational non-profit organization that sponsors and helps running various conferences (PlopConference, EuroPlop, ChiliPlop, KoalaPlop, Mensore PLoP, SugarloafPLoP, and UP97) and has been responsible for getting the *Pattern Languages Of Program Design* series of books put together and published. Since 2009;

1. **Member** of the *Software Engineering Group* at Faculty of Engineering, University of Porto. Since 2008.

3 Educational Activities and Experience

I have been a teacher since 2008 of **22 different curricular units** (the vast majority classified under the *Software Engineering* domain) in **4 different institutions**, **19 at FEUP** (§ 3.1, p. 24), and **7 (co-)coordinations** so far, with positive feedback from students[1]. I have also participated in the creation of **4 curricular units** (§ 3.3, p. 31) and **1 master degree** (§ 3.2, p. 30). Of particular relevance, is the **2 self-assessment committees** that conferred the EURACE and A3ES accreditations for MIEIC (§ 3.4, p. 33). I have also participated in **5 editions of** *Universidade Júnior*, am the **head of the MIEIC student's laboratory**, and the **ACM ICPC trainer** (international collegiate programming contest) of FEUP teams (§ 3.5, p. 34).

3.1 TEACHING ACTIVITY

3.1.1 Production of Pedagogical Material

All **7 occurrences of (co-)coordinations** have involved the production of pedagogical material for the theoretical (T) classes, which are usually published in *Moodle*. I also maintain a BLOG { http://hugosereno.eu }, where I usually discuss some topics related to Informatics in general, and gather solutions to class exercises in particular. Sometimes I also publish pedagogical material on *Slideshare*, such as this very popular presentation on the

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[1] Extracting all information from pedagogical inquires is not easy (due to all orthogonal metrics and lectured units). These can be consulted in SIGARRA (UP's information system) on-demand, and I can compile a report on-request. Qualitatively, they are *average* and *above average*. One can, however, ascertain my *teaching quality* by looking at the number of students that chose me as their dissertation supervisor.

Laws of Software Engineering with Prof. Pascoal Faria { `https://www.slideshare.net/bytter/soft-eng-laws` }.

3.1.2   School year 2017/2018

Coordinator of *Information Systems and Software Engineering Seminar*, and *Software Engineering Seminars*, thus (**co-**)**coordinating 4 curricular units**. The number of students is still unknown, although MESW has 18 currently enrolled, and MIEIC has a *numerus clausus* of 117. This is also the **1st editions of 2 curricular units**, *viz.* (i) *Cloud and Service Oriented Computing* (§ 3.3.1, p. 31), and (ii) *Software Engineering Seminars* (§ 3.3.2, p. 31). Most are classified under the *Software Engineering* domain, except *FEUP Project* (Personal and Interpersonal Skills), and *Object-Oriented Programming Laboratory* (Programming).

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK
MIEIC	1Y 1S	1.5	FEUP Project	Instructor	1P
MESW	2Y 1S	6	Cloud and Service Oriented Computing	Coordinator	1.5TP
MESW	2Y 1S	6	Software Engineering Seminars	Coordinator	3TP
MIEIC	4Y 1S	7.5	Software Development Laboratory	Co-Coordinator	1T 3P
MIEIC	5Y 1S	6	Inf. Sys. and Software Eng. Seminar	Coordinator	3TP
MIEIC	2Y 2S	6	Object-Oriented Programming Lab.	Instructor	6P
MIEIC	4Y 2S	6	Software Systems Architecture	Instructor	3TP
MIEIC	4Y 2S	7.5	Project Management Laboratory	Instructor	3P
—	—	46.5	**Total: 8**	—	**12/term**

Table 3.1: Summary table for the school year 2017/2018 at FEUP.

3.1.3   School year 2016/2017

During this school year, I was the sole teacher for the 1st edition of the curricular unit *Software Architecture and Design* at MESW (§ 3.3.3, p. 32). Every curricular unit is classified under the *Software Engineering* domain, except *Object-Oriented Programming Laboratory* (Programming), and *Distributed Systems* (Operating Systems and Networks).

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
MESW	1Y 1S	6	Software Architecture and Design	Coordinator	3TP	18
MIEIC	3Y 1S	6	Software Engineering	Instructor	4TP	42
MIEIC	4Y 1S	6	Formal Methods in Software Engineering	Instructor	2TP	48
MIEIC	2Y 2S	6	Object-Oriented Programming Lab.	Instructor	3P	25
MIEIC	3Y 2S	6	Distributed Systems	Instructor	4P	48
MIEIC	4Y 2S	6	Software Systems Architecture	Instructor	3TP	21
MIEIC	4Y 2S	7.5	Project Management Laboratory	Instructor	3P	20
—	—	43.5	**Total: 7**	—	**11/term**	—

Table 3.2: Summary table for school year 2016/2017 at FEUP.

3.1.4   School year 2015/2016

During this school year, I co-coordinated the course *Software Architecture* with Prof. Rui Maranhão at the Faculty of Sciences FCUP. The unit were a composition among several courses, *viz.*: (a) L:CC / MI:ERS, and (b) L:AST / L:B / L:CC / L:F / L:G / L:M / L:Q. Every curricular unit is classified under the *Software Engineering* domain, except *Object-Oriented Programming Laboratory* (Programming), *Operating Systems* (Operating Systems and Networks), and *Distributed Systems* (Operating Systems and Networks).

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
MIEIC	3Y 1S	6	Software Engineering	Instructor	4TP	35
MIEIC	4Y 1S	6	Formal Methods in Software Eng.	Instructor	2TP	24
MIEIC	4Y 1S	7.5	Software Development Laboratory	Instructor	3P	22
MIEIC	4Y 2S	7.5	Project Management Laboratory	Instructor	3P	23
MIEIC	2Y 2S	6	Object-Oriented Programming Lab.	Instructor	3P	25
FCUP (A) (B)	2Y 2S	5/6	Software Architecture	Co-Coordinator	1T 2P	36
MIEIC	2Y 2S	6	Operating Systems	Instructor	2P	25
MIEIC	3Y 2S	6	Distributed Systems	Instructor	4P	45
—	—	56	**Total CUs: 8**	—	**12/term**	—

Table 3.3: Summary table for school year 2015/2016, at FEUP and FCUP.

3.1.5   School year 2014/2015

During this school year every curricular unit was classified under the *Software Engineering* domain. I was the coordinator for *Requirements Engineering for Services*, which proved to be quite a challenge. The previous syllabus incorporated very strong notions supported on the requirement that students had a background in *Informatics Engineering*, which is not the case. I had to adapt during the runtime of the course in order to better suit the students strengths and needs.

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
MIEIC	3Y 1S	6	Software Engineering	Instructor	8TP	70
MIEIC	4Y 1S	6	Formal Methods in Software Engineering	Instructor	4TP	45
MIEIC	4Y 2S	7	Project Management Laboratory	Instructor	3P	21
MESG	1Y 2S	6	Requirements Engineering for Services	Coordinator	3TP 1O	14
—	—	25	Total CUs: 4	—	9.5/term	—

Table 3.4: Summary table for school year 2014/2015, at FEUP.

3.1.6   School year 2013/2014

During this school year, I taught simultaneously in **3 different courses**, namely CINF, MIEIC and MIEEC. The curricular units *Object-Oriented Programming Laboratory* and *Programming II* were classified under the *Programming* domain, while *Operating Systems* is *Operating Systems and Networks*.

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
CINF	3Y 1S	6	Information Systems Analysis II	Instructor	4P	39
MIEIC	3Y 1S	6	Software Engineering	Instructor	2TP	19
MIEIC	5Y 1S	6	Agile Software Dev. Methodologies	Instructor	2TP	19
MIEIC	2Y 2S	6	Object-Oriented Programming Laboratory	Instructor	3P	20
MIEEC	1Y 2S	7	Programming II	Instructor	6P	46
MIEEC	3Y 2S	6	Operating Systems	Instructor	2P	15
—	—	37	Total CUs: 6	—	9.5/term	—

Table 3.5: Summary table for school year 2013/2014, at FEUP.

3.1.7   School year 2012/2013

During this school year, most curricular units were classified under the *Software Engineering* domain, except for *Programming II* (Programming), which I **co-coordinated** with Prof. Luís Teixeira and Prof. Daniel Moura.

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
CINF	3Y 1S	6	Information Systems Analysis II	Instructor	4P	43
MIEIC	3Y 1S	6	Software Engineering	Instructor	2TP	14
MIEIC	5Y 1S	6	Agile Software Dev. Methodologies	Instructor	2TP	21
MIEEC	1Y 2S	7	Programming II	Co-Coordinator	2T 12P	126
—	—	25	Total CUs: 4	—	11/term	—

Table 3.6: Summary table for school year 2012/2013, at FEUP.

3.1.8   School year 2011/2012

During this school year, most curricular units were classified under the *Software Engineering* domain, except for *Programming II* (Programming). I **co-coordinated 2 curricular units**, namely *Programming II* with Prof. Luís Teixeira and Prof. Maria Eduarda, as well as the 1st edition of *Information Systems and Software Engineering Seminars* with Prof. Ademar Aguiar and Prof. Raul Vidal (§ 3.3.4, p. 33).

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
CINF	3Y 1S	6	Information Systems Analysis II	Instructor	4P	48
MIEIC	5Y 1S	6	Inf. Sys. and Software Eng. Seminars	Co-Coordinator	1TP	5
MIEIC	5Y 1S	6	Agile Software Dev. Methodologies	Instructor	2P	18
MIEEC	1Y 2S	7	Programming II	Co-Coordinator	2T 12P	158
—	—	25	Total CUs: 4	—	10.5/term	—

Table 3.7: Summary table for school year 2011/2012, at FEUP.

3.1.9   School year 2010/2011

During this school year, most curricular units were classified under the *Software Engineering* domain, except for *Object-Oriented Programming Laboratory* (Programming). The

curricular unit *Agile Software Development Methodologies* was lectured at ISEP for the *Post-Graduation in Enterprise Applications Engineering*, by invitation from Prof. Paulo Sousa.

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
MIEIC	4Y 1S	6	Formal Methods in Software Engineering	Instructor	6TP	71
MIEIC	4Y 2S	7	Project Management Laboratory	Instructor	3P	20
MIEIC	2Y 2S	6	Object-Oriented Programming Laboratory	Instructor	3P	15
PGEAE	1Y 2S	—	Agile Software Development Methodologies	Coordinator	6P	22
—	—	19	**Total CUs: 3 (FEUP) + 1 (ISEP)**	—	**9/term**	—

Table 3.8: Summary table for school year 2010/2011, at FEUP and ISEP.

3.1.10   School year 2009/2010

During this school year, I taught *Operating Systems* which is classified under the *Operating Systems and Networks* domain. It was a particularly calm year in terms of teaching, since it coincided with my last year of Ph.D.

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
MIEIC	3Y 1S	6	Operating Systems	Instructor	3P	20
MIEIC	4Y 2S	6	Formal Methods in Software Engineering	Instructor	6TP	54
—	—	12	**Total CUs: 2**	—	**4.5/term**	—

Table 3.9: Summary table for school year 2009/2010, at FEUP.

3.1.11   School year 2008/2009

In 2008, after finishing the first year of my Doctoral Programme, I applied for an Invited Assistant Lecturer[2] position at FEUP, and began teaching *software engineering*-related courses. Of particular challenge was the *Formal Methods in Software Engineering*: a highly mathematical-oriented curricular unit, with very limited available professors at FEUP in the field, and to which fourth-year students develop a *"peculiar resistance"*.

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[2]   *Assistente Convidado.*

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
MIEIC	4Y 1S	7	Software Development Laboratory	Instructor	3P	16
MIEIC	3Y 1S	6	Software Engineering	Instructor	2TP	19
MIEIC	4Y 2S	5	Formal Methods in Software Engineering	Instructor	4TP	46
—	—	18	Total CUs: 3	—	4.5/term	—

Table 3.10: Summary table for school year 2008/2009, at FEUP.

3.1.12 School year 2007/2008

I started my teaching career at ISTEC (*Instituto de Tecnologias Avançadas do Porto*), by being the sole instructor of the curricular unit *Database Management Systems*. Contrary to university-level students, most of them where also professional workers in the field, which represented an additional teaching challenge.

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK	STUDENTS
LEI	2Y 2S	—	Database Management Systems	Coordinator	4TP	21

Table 3.11: Summary table for school year 2007/2008, at *Instituto de Tecnologias Avançadas* (ISTEC).

3.2 NEW DEGREE-AWARDING COURSE (MESW)

In 2016, a new degree-awarding course begun being lectured at FEUP, viz. the *Master in Software Engineering* (MESW). This course began being discussed and prepared as early as 2014, and I have been part of the team since then. The current Director is Profª Ana Paiva. The goal and target audience of this two-year degree is to empower software *professionals* with specific state-of-the-art knowledge in *Software Engineering*. One of the main *Unique Selling Points* of MESW, when compared to the broader and more established MIEIC, is (1) the focus on the *Software Engineering* domain, (2) not being designed as a first degree, and (3) pursued by students with support from industrial partners through sponsored scholarships. The *Master in Software Engineering* might also serve as a front-line for experimenting with a mature audience the newest research and techniques of our domain.

3.3 NEW CURRICULAR UNITS

3.3.1   Cloud and Service Oriented Computing (2017-18)

This curricular unit was designed by me for the MESW proposal. Next year will be the first edition (2017—18), where I will be the coordinator.

Description. The objective of this curricular unit is directed to techniques and computation processes based on service oriented architectures, with special focus on infrastructure virtualization environments, commonly known as cloud. It is intended to develop the capabilities to manage the entire software life cycle, from analysis, architecture and design, to implementation and maintenance, including the specificities in algorithms, best practices and standards used in this field. At the end of this study cycle, students should be able to design and implement large-scale software in fallible environments subject to high stress, low latency, high bandwidth and performance, composed of a large number of highly-distributed heterogeneous components subject to interference and unplanned interactions.

Planned syllabus. Fundamentals: Classical vs. Service-Based Architectures (SOAs). Micro-services. Standards and patterns of service communication. Webservices, SOAP and REST. Message Bus and Queues. Principles and models of parallel and distributed computing. Actor model. Map-reduce / Lambda Architecture. Theoretical and practical limits. Virtualization of Infrastructures. PaaS, SaaS and IaaS. Public and Private Clouds. Storage. Elasticity. HighAvailability and replication. Clusters. Monitoring and Diagnosis. Faults and fault tolerance. Latency and Interference. Reactive Systems and Streams. Safety. DevOps and Code as Infrastructure. Applications: Object-oriented programming paradigm with Scala. Actor model with Akka. MapReduce architectures with Hadoop and Spark. Public clouds with Amazon AWS and Google Computing Engine. Private Clouds with Free Software (OpenStack). KeyValue databases. Buses based on AMQP. ZeroMQ. Continuous deployment techniques, zero dead times, based on Docker.

3.3.2   Software Engineering Seminars (2017-18)

This curricular unit was designed together with Prof. Ademar Aguiar during the creation of MESW. Next year will be the first edition (2017—18), where I will be the coordinator.

Description. The objective of this curricular unit is to present, in the form of independent seminars, a wide range of subtopics of Software Engineering, which, due to their relevance and novelty in terms of research, innovation or industrial application, allow students to better prepare themselves for the eventual realization of a scientific or applied research work in a field of Software Engineering. At the end of the study cycle, students should have

a broad view of relevant topics and subtopics in the area of Software Engineering.

Planned syllabus. Research topics and recent evolutions of knowledge in Software Engineering, namely: Model-based software engineering; Reuse of large-scale software (software product lines, standards and frameworks); Software maintenance (understanding, reverse engineering); Processes of software and process improvement (agile methods, PSP / TSP / CMMI); DevOps; Knowledge Management in Software Projects; (Ultra-)Large Scale Software Architecture; Object-functional Languages and Programming; Reactive Systems; Big data.

3.3.3   Software Architecture and Design (2016-17)

This curricular unit was designed together with Prof. Ademar Aguiar during the creation of mesw, and coordinated by me during the school year 2016—17. Next year (2017—18), Prof. Ademar Aguiar will be the coordinator.

Description. The architecture of a software system describes its overall structure in terms of the components, the external properties of these components and their interrelationships. For medium and large-sized systems the proper choice of architecture is of crucial importance to the success of its development. This Curricular Unit has as its main objective to equip students with the essential concepts of software architectures, design patterns and directly related topics, as well as that of software components. It aims to enable students to be able to design, understand and evaluate software system architectures, both at the level of macro-and microarchitecture abstraction, and thus familiarize students with the fundamental concepts of software architecture, the properties and applicability of the different existing styles, the most popular design patterns, components, reusable architectures and the relationships of these concepts with software reuse.

Syllabus. Introduction. Software design: concepts, principles and fundamental approaches. What is software architecture? The importance of software architecture. Examples of micro- and macro-level architectures: design patterns, frameworks and production lines. Architecture Styles. The main architectural styles. Classical Samples Patterns of Design: The origins of software standards. Types of software standards: architectural patterns, design patterns, idiomatic structures. Examples of Architecture Standards: POSA patterns. Patterns of Design: GoF patterns. Software Architectures: Architectures and Quality Attributes. Styles of architectures, reference models and reference architectures. Design, evaluation and refinement of software architectures. Representation and Documentation of software architectures. Reuse of software architectures: production lines, frameworks, software components. (Ultra-)Large Scale Software Architectures: cloud computing, microservices, service-oriented architectures (SOA).

3.3.4   Information Systems and Software Engineering Seminars (2011-12)

The first edition of this curricular unit was designed together with Prof. Ademar Aguiar and Prof. Raúl Vidal during the school year 2011-12 for MIEIC. Next year (2017—18), I will be the coordinator.

Description. The goal of this curricular unit to present, in the form of independent seminars, a wide range of subtopics of both Software Engineering and Information Systems domains, thus increasing students' exposure to scientific research, but also raising the collaboration between the Industry and the Academy. During the first occurrence, we made usage of two pedagogical activities, viz. (a) inviting professionals and researchers to give talks, and (b) asking students to study certain topics of interest and allowing themselves to give a talk. During the following years this approach evolved into Talk-a-bit, were students are asked to be the organisers of a thematic conference and themselves invite people from the Academy and Industry. Next year, I intend to create synergies between this unit and MESW's Software Engineering Seminars, for which purpose I have already initiated conversations among all stakeholders (students included) to take these ideas to unprecedented levels of cooperation.

Syllabus. Research topics and recent evolutions of knowledge in both Informations Systems and Software Engineering.

3.4 EDUCATIONAL AND MANAGEMENT SERVICES

4. **Self-assessment Committee** for the A3ES accreditation of the MIEIC course at FEUP 2012—2013. Member of the self-assessment committee (team of 4), that was responsible of gathering and presenting all necessary documentation for the Assessment/Accreditation of Study Programmes in Operation. The Agency for Assessment and Accreditation of Higher Education (A3ES), at 20th of June, 2014, and in accordance with the recommendation and support produced by the respective External Review Team, decided to accredit MIEIC, without conditions, for a period of 5 (five) years. More information can be found in the reports made available by A3ES.

3. **Self-assessment Committee** for the EUR-ACE accreditation of the MIEIC course at FEUP 2011—2012. Member of the self-assessment committee (team of 4), that was responsible of gathering and presenting all necessary documentation for the EUR-ACE® framework and accreditation. FEUP is proud to be the first Portuguese higher education institution with all its Engineering courses recognized by ENAEE (European Network for Accreditation of Engineering Education) through the EUR-ACE Quality Label. The assessment of MIEIC took place in 2012 and the accreditation was granted for a 6 (six) year period, until 2018.

2.   **ACM ICPC Trainer** (international collegiate programming contest) of FEUP teams
Since 2013, I've been the trainer at FEUP for the IBM-sponsored, annual multi-tiered competitive programming competition held among universities of the world. Recent World Champion teams have been recognized by their country's head of state and at the annual ACM Awards Ceremony. Past ICPC alumni populate much of the high tech information technology industry worldwide.

1.   **Head of Laboratory**. MIEIC Student's Laboratory at FEUP, since 2011.

3.5 OTHER PEDAGOGICAL ACTIVITIES

I have participated in **5 editions of *Universidade Júnior***, with **2 different activities**, as well as cooperating with *Escola Secundária Filipa de Vilhena* as an *Examiner* for the professional aptitude evaluation of high-school students.

5.   **Examiner**, Tiago Sousa, *"Raise of the Dead"*. Professional Aptitude Evaluation at *Escola Secundária Filipa de Vilhena*. 2015.

4.   **Examiner**, Bruno Jesus, *"Medionics: Um site dinâmico"*. Professional Aptitude Evaluation at *Escola Secundária Filipa de Vilhena*. 2015.

3.   **Co-Organizer**, *"My first 3D film"*, 1st , 2nd , 3rd and 4th editions. An introduction to visual programming languages using Alice, ages 12–15 @ Universidade Júnior. 2014 — 17.

2.   **Co-Organizer**, *"Mummy, daddy, I shrunk my computer!!!"*. 1st and 2nd editions. An introduction to the RaspberryPI, electronics and programming, ages 12–15 @ Universidade Júnior. 2013 — 14.

1.   **Co-Organizer and Lecturer**, *"An Introduction to UML 2.x"*. 10 students @ Critical Software, S.A. 2010.

4 Knowledge Transfer

I participated in 11 invited talks, 2 career fairs, and 3 media events. I worked in 2 military R&D projects for NATO, 3 research projects in industrial environments, and 8 development and consultancy projects. I also co-founded (as the CTO) ShiftForward S.A., which was incubated in UPTEC, successfully managed to raise 1M€ in venture capital (public and private funding), and achieved 10M€ in valuation. I am a member of *Coding for Social Impact Labs*, and co-founder of the *Software and Beyond* consultant, both *University of Porto* entities. I am also advisor for the *Founders Founders* co-working space (now part of the *ScaleUP Porto* initiative). I also participated as a reviewer for Portugal Ventures' *Call on Entrepreneurship*.

4.1 INVITED TALKS

11. **The Peter Fatality: Why People Rise to the Level of their Incompetence**, Commit Porto, Faculty of Engineering, University of Porto. 2015.
    I was a moderator of a panel that discussed the career of a software engineer working in Portugal, and the (in)evitability of the almost forced progress from technical to management positions.

10. **Software and Services**, 8th Congress on Services and Management Engineering (CESG 2014).
    Participation in a panel about the career opportunities of newly graduated in services and management engineering.

9. **Computer Science Challenges from the Industry**, INForum 2014, Porto.
Participation in a panel about what can the Academy do to answer the needs for the industry in the next 5 to 10 years.

8. **Why Post-Functional Programming Matters**, Ripple Conference 2014, Porto.

7. **Workshop: Introduction to Scala**, Faculty of Engineering, University of Porto. 2013.

6. **Why Post-Functional Programming Matters**, 8th National Meeting of Informatics Students (ENEI 2013).

5. **Lessons Learned in Entrepreneurship**, Beta-Talk Porto, Facts Coworking. 2013.

4. **Incomplete by Design**, Inside Awareness, Faculty of Engineering, University of Porto. 2011.

3. **Causal Connections**, Models@Runtime Workshop, Denver, Colorado, USA. 2009.

2. **Pattern Languages**, Seminários Ortogonais, Faculty of Sciences, University of Porto. 2009.

1. **The Path to Abstraction**, Instituto Superior de Tecnologias Avançadas. 2008.

4.2 PARTICIPATION IN CAREER FAIRS

2. **ShiftForward**, JobIT 2015, Faculty of Engineering, University of Porto;

1. **ShiftForward**, JobIT 2014, Faculty of Engineering, University of Porto.
A job fair where people advertised companies in an attempt to capture newly graduated. My focus was to trigger the interest in applied research and development, and to show students they can pursue research topics in direct connect with the industry.

4.3 MEDIA COVERAGE

3. **Uber e Negócios Online**, Jornal da Noite @ RTP2. 2015.
I was invited for a live commentary at *Jornal da Noite*, to talk about the influence of Uber and Online Business, after several riots happened all over the country;

2. **Interview with ShiftForward**, TSF Mundo Novo. 2013.
TSF's *Mundo Novo* is a radio program on entrepreneurship that decided to interview me as founder of ShiftForward, and in particular due to its position in UPTEC and relationship with the University of Porto;

1. **One Minute Engineering**. 2012.
The non-commercial series *One Minute Engineering* was promoted by FEUP in the project MEDIA CIÊNCIA, that supported the production of contents for scientific and technological dissemination in media, target to a general audience through public channels, such as *RTP Informação*, *Público Online* and *Rádio Nova*. The series features researchers and

professors from more than ten scientific domains, in short video episodes. My participation was an episode about *What is a Programming Language?*, which can be found in the archives: { `paginas.fe.up.pt/~engmin` }.

4.4 MILITARY RESEARCH AND DEVELOPMENT

2.   **MRS: Mip Reference System**

2004 — 05. *Junior Researcher* subcontracted for NC3A, classified
Architecture, design and implementation of the MIP reference system for LC2IDEM data replication, used by the NATO R&D Agency, and to which the alliance implementations have to comply;

1.   **MIPx: Framework for Development of Command and Control Systems**

2003 — 04. *Junior Researcher* subcontracted for NC3A, classified
Architecture, design and implementation of an infrastructure to develop LC2IDEM-based Command and Control Systems.

4.5 RESEARCH PROJECTS WITHIN INDUSTRIAL CONTEXTS

The SIFIDE-II national programme[1] awards financial support to commercial projects that provide strong evidence of *scientific research and development*, after being evaluated by a designated committee. This is a good alternative to FCT-subsidized projects for companies that which to (i) proceed with the project even if they aren't funded, and (ii) wish to keep their intellectual property as a trade secret. Both *Ad-Forecaster* and *Ad-Stress* projects where funded through this national programme, with me being the *Principal Investigator* in the application.

3.   **Ad-Forecaster**

2012 — 16. *Principal Investigator* at ShiftForward. *cf.* SIFIDE 0694/2013-E
A next-generation, hybrid cloud, forecasting engine for online ad campaigns that overcomes key limitations of existing forecast engines, by allowing accurate prediction of future ad impressions traffic levels and campaign inventory availability using unlimited number of targeting variables, including geo, keywords, key-values, cookies, and multiple frequency capping groups at banner, booking, line item or campaign level;

2.   **Ad-Stress**

2012 — 13. *Principal Investigator* at ShiftForward. *cf.* SIFIDE 0694/2013-E

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[1]   Sistema de Incentivos Fiscais à I& D Empresarial - II.

A platform that efficiently simulates complete browser interactions with advertising platforms at a very large scale (over 100m unique users) with multiple interactions with the system. It can also simulate server-to-server connections for testing RTB Clients and Servers at very high requests per second (over 50k);

1. **Oghma**

    2007 — 11. *Doctoral Researcher* at ParadigmaXis. *cf.* SFRH/BDE/33298/2008

    One of the results from my Ph.D. work, it is the current main infrastructure of several production-level Information Systems developed at ParadigmaXis, including Locvs, Zephyr and GISA.

4.6 DEVELOPMENT AND CONSULTANCY PROJECTS

8. **Ad-Stax** at ShiftForward { http://www.adstax.com }.

    2014 — 16. *Chief Technology Officer.* Adstax is a scalable, real-time advertising platform-as-a-service, fully customisable and API-accessible, that enpowers a company to integrate 1st and 3rd party technologies within its walled garden;

7. **Re-engineering of Medical Software** at INESC TEC.

    2012. *Project Leader and Senior Consultant* for IM3DICAL re-engineering of its medical software for Mac OSX and iOS platforms. Technologies: Objective-C, XML;

6. **HL7 Integration** at INESC TEC.

    2012. *Project Leader and Senior Consultant* for IM3DICAL integration with HL7. Technologies: Microsoft® BizTalk, XML, HL7, MLLP;

5. **Coolbiz: Trading System** at ParadigmaXis.

    2011. Software Quality Engineer for a back-end and front-end financial trading system for *Banco Carregosa*. Technologies: C++, Apache QPID, AMQP, QT, XML;

4. **SMQVU: Urban Life Quality** at ParadigmaXis.

    2009 — 10. Analysis and development of an Information System for *Câmara Municipal do Porto – Gabinete de Estudos e Projectos.* Supports the assessment of urban life quality attributes of the city of Porto, by providing a centralized tool to collect, analyze and synthesize statistical data over hundreds of indexes. Technologies: C#, WPF, Oracle database 11g, SQLite, QT, XML;

3. **Locvs: Architectural and Archaeological Heritage** at ParadigmaXis.

    2007 — 10. Analysis and development of an Information System for *Câmara Municipal do Porto, Departamento Municipal do Património e Cultura.* It supports the full workflow of collection, process, analysis and storage of textual, graphical and geospatial heritage information of the city of Porto. Technologies: C#, WPF, SQLite, ARCGIS, XML;

2. **GeoXis: Geo-spatial Back-end Framework and Infrastructure** at ParadigmaXis.
   2006 — 07. Design and implementation of an infrastructure for displaying and analysing geospatial data. Used by several partners including (but not limited to): Vodafone, Portugal Telecom, Optimus, Clix and ITP. Technologies: Python, C++, C#, HTML5, Javascript, PostgreSQL, PostGIS, XML;

1. **MapAdventure** at ParadigmaXis { http://www.mapadventure.com.pt }
   2005 — 06. Design and implementation of an application and infrastructure for displaying and using military cartography in mobile devices, intented for sports and leisure activities in the wild. The system was developed in cooperation with Infoportugal and IGeOE. Technologies: C++, C#;

4.7 OTHERS

8. **Personal Blog** at { http://hugosereno.eu }.
   I maintain a blog since 2013, where I talk about *"software, some mathematics, and the occasional philosophy; not necessarily in that order"*. Not only I use it to disseminate knowledge on several areas, I occasionally also post resolutions to exercises;

7. **Founder** of *Software and Beyond*.
   In 2017, together with Prof. Ademar Aguiar, we created a "Strategic Consulting on Pragmatic Software Craft" entity at FEUP, which is now starting to give the first steps in international consulting on *Software Architecture* and related topics;

6. **Juror** at the Spark Agency's *Pitch Bootcamp*, FEUP, Porto, Portugal. 2017;

5. **Member** of *CSI Labs* since 2016 { http://codingforsocialimpact.fe.up.pt }
   Coding for Social Impact is a space to promote the collaboration between social entrepreneurs, technologists, creatives, changers and supporters — all with a passion to build minimal technology to effectively support high-impact concrete needs that arise from the society. Our space is open to being used as a laboratory, for co-working, or for meetings and training sessions. We additionally support the acceleration of social impact, from concept to development, by combining well-known *agile practices*, *lean entrepreneurship* and *social innovation*. Together with Prof. Ademar Aguiar and Eng. Nuno Sousa, I have been part of the team since its foundation.

4. **Exhibitor** at *Movimento Código Portugal*, Lisboa, Portugal, 2016 — 17.
   Due to our involvement in *Universidade Junior* and *CSI Labs*, we were invited exhibitors at the *Pavilhão da Ciência*, in the context of 1st and 2nd editions of *Movimento Código Portugal*. The goal was the dissemination of programming technologies using a mix of software and hardware (such as Pico-8 and RaspberryPI) aimed for children and teenagers, with the goal of increasing awareness in *Informatics Engineering*.

3. **Project Reviewer** for the Portugal Ventures' *Call on Entrepreneurship*. 2016.
    The Call For Entrepreneurship is the entry point to the Ignition Programme, an initiative led by Portugal Ventures to promote investment for market-oriented scientific and technological projects in the Seed Capital phase, with funds coming from both public and private sources. As an expert, I integrated a multi-disciplinar panel with the role of evaluating projects from both their technical feasibility, as well as their novelty when compared to the state-of-the-art, thus supporting the decision on the investment of millions of euros of vc in these startups;

2. **Advisor** for the *Founders Founders* co-working space. 2015 — 16;

1. **Juror**. best – Days on Technology 2010 at feup.