

UNIVERSITY OF PORTO · FACULTY OF ENGINEERING

Curriculum Vitæ



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Assistant Professor

of the

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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 (<i>a.k.a.</i> Hugo S. Ferreira, Hugo Ferreira)
Current Position(s)	Assistant Professor at Universidade do Porto - FEUP Research Associate at INESC TEC
Scientific Domain	Software Engineering (<i>Software and its engineering</i> 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 73 publications, 53 in conferences with scientific referee, 8 in refereed journals, and 12 others. 3 best paper awards, and 5 invitations for extended versions in journals. 20 are indexed in ISI WOS, 41 in SCOPUS and 47 in DBLP. Attracted over 559 citations, resulting in a *h-index* of 15 and *i10-index* of 24. Participated in 10 scientific projects, 5 national and 5 European, with more than 30M€ in funding. Reviewer in 12 periodics, 38 (inter)national conferences and 2 books. Involved in the organization of 15 scientific events. Member of 42 examining committees (1 PH.D. and 41 M.SC.), 27 as chair, and 15 in external institutions, totaling 109 interventions in scientific and professional communities. 80 (co-)supervisions, of which 71 M.SC., 2 PH.D. (1 finished), 2 undergraduates, and 5 grants. **Research Associate** at INESC TEC. Member of the International Hillside Group, and FEUP's Software Engineering Research 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 6 editions of *Universidade Júnior*, head of the MIEIC student's laboratory, and former ACM ICPC and IEEE trainer for competitive programming at FEUP.
- **Knowledge Transfer:** 14 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 later acquired by Velocidi, Inc. Member of *Coding for Social Impact Labs*, and co-founder of *Software and Beyond*. Former advisor for the *Founders Founders* co-working space (part of the *ScaleUP Porto* initiative). Reviewer for Portugal Ventures' *Call on Entrepreneurship*. Independent Expert for the European Commission and the National Innovation Agency (ANI).

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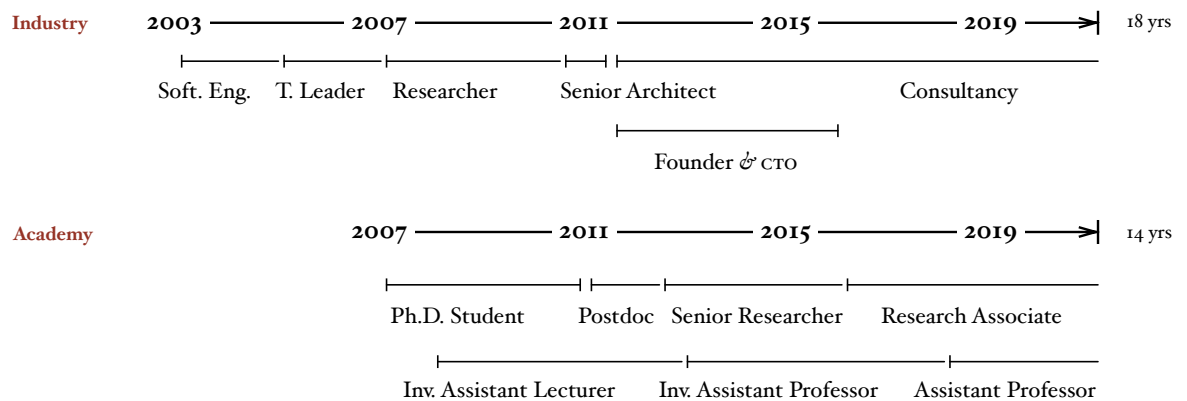
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1 Background

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Hugo is a professor since 2008 at multiple educational institutions, and currently holds a tenure track position at the Faculty of Engineering, University of Porto. He's also been with INESC TEC since 2007, currently as an Associate Researcher. But his career encompasses a large spectrum of activities beyond the academy. In 2004, he worked in the military R&D for NATO. He was Senior Architect in a Software House up until finishing his Ph.D. During the exercise of independent consultancy, he co-founded (as CTO) an Ad-Tech company specialized in Forecasting and Machine Learning, subsequently acquired in 2018. Part of the European Commission experts panel for H2020, his main research areas are Software Engineering, IoT, and Edge/Cloud Computing, although he has a variety of publications on several other subjects, such as Blockchain technologies, Machine Learning and e-Health. Hugo's expertise goes from the very large (handling hundreds of servers for massive parallelism with Akka) to the very small (designing his CPU in Verilog and discrete circuits). He can be found in the acknowledgment sections of books on Scala and Patterns. Hugo is passionate about technology; even after mentoring more than 80 students (BSc, MSc, Ph.D.), he craves for writing code, for learning new programming languages, and even to do some code golf in APL.



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 seven.

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

- 2020— **Independent Expert**, European Commission
Project evaluations for scientific funding (H2020-IF, etc.)
- 2020— **Independent Expert**, National Innovation Agency (ANI)
Project evaluations for scientific and industry research funding (RCI, etc.)
- 2008— **Assistant Professor**, Faculty of Engineering, University of Porto (FEUP)
Previously: Invited Assistant Professor (2013—18) and Invited Assistant (2008—13).
Coordinates and teaches courses (§ 3.1, p. 36), mainly at the *Integrated Master in Informatics and Computing Engineering* and *Master in Software Engineering*, and supervises Ph.D and M.Sc. students (§ 2.4, p. 26).
- 2011— **Research Associate**, Instituto de Engenharia de Sistemas e Computadores (INESC TEC)
Previously: Senior Researcher (2013—16) and Postdoctoral Researcher (2011—12).
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.
- 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.
In mid 2011¹ I co-founded as *ShiftForward*, a 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

¹ It was a personally demanding period of time as I was taking three simultaneous roles in three different institutions (see the timeline in the first page).

clients including, but not limited to, *Xplosion Interactive*, *Semasio*, *Wellington Partners*, *Eyeota*, *Pubmatic*, *AudienceScience*, and *ClipKit*.

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 angels, including Florian Heinemann and Brian Fitzpatrick.

As a CTO, I conceptualized and designed several software products, with a growing in-house team of up to 10 software engineers, which I personally recruited and trained. Some of them can be found today in big-tech companies such as Facebook, or in leading startups such as Parity Technologies. Some of our products incorporated novel scientific research and were subsequently financed by national scientific programs. These include the AdForecaster (see below) and the AdStax.

The success of our products led to several acquisition proposals and an estimated valuation of 10M€. In 2016, after training our core engineers, I withdrew from my official role of CTO (which remained vacant) to focus on my academic tenure track. Early 2018, we were acquired by Velocidi Inc., for an undisclosed amount.

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, where 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, where — 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

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2.4	Scientific Supervision of Individuals and Teams	26

2.1 SCIENTIFIC AND TECHNICAL PRODUCTION

Since 2008, I have co-authored 53 articles in conferences with scientific referee, 8 articles in refereed periodics, 6 pre-prints and 6 other articles. In total, these 73 publications have attracted over 559 citations, resulting in an h-index of 15 and i10-index of 24¹. A summary of the most cited publications is shown in Table 2.1 (p. 7) and the complete list can be found in the following subsections. Indexed articles by the *Web of Science* (20), *SCOPUS* (41), *The DBLP Computer Science Bibliography* (47), and *Emerging Sources Citation Index* (1) are identified by the tags [WOS], [SCOPUS], [DBLP], and [EMERGING CITATION] respectively. Recent articles are still waiting for proper indexation.

2.1.1 Theses

2. PhD dissertation, *Adaptive Object-Modeling: Patterns, Tools and Applications*, Faculty of Engineering, University of Porto, 2010;
1. Licenciatura's Project Report, *Framework for Development of Command & Control Systems*, Faculty of Engineering, University of Porto, 2004.

¹ Citations and indexes were obtained by using [Google Scholar](#), on June 18, 2021.

Title	Citations	Year
PETTool: A Pattern-based GUI Testing Tool	37	2010
Patterns for Consistent Software Documentation	32	2009
Patterns for Data and Metadata Evolution in Adaptive Object-Models	31	2008
A Brief Overview of Existing Tools for Testing the Internet-of-Things	27	2018
Ubiquitous Ambient Assisted Living Solution to Promote Safer Independent Living...	25	2012
Live Software Development: Tightning the Feedback Loops	23	2019
Dynamic Allocation of Serverless Functions in IoT Environments	22	2018
Smartphone Based Fall Prevention Exercises	22	2013
A Blockchain-based Approach for Access Control in eHealth Scenarios	21	2018
Patterns for Software Orchestration on the Cloud	21	2015
Incremental Knowledge Acquisition in Software Development using a Weakly-typed...	19	2009
Patterns for Things that Fail	16	2017
Automating the Extraction of Static Content and Dynamic Behaviour from e-Comm...	16	2017
A Reactive and Model-based Approach for Developing Internet-of-Things Systems	15	2018
Adaptive Object-Modelling: Patterns, Tools and Applications	15	2010
Total citations for top 15 publications	342 (61%)	—

Table 2.1: Most cited publications, contributing to an *h-index* of 15. These papers constitute 61% of all citations.

2.1.2 Papers in periodics with scientific referee

8. André Lago, João Pedro Dias, Hugo Sereno Ferreira, *Managing Non-Trivial Internet-of-Things Systems with Conversational Assistants: A Prototype and a Feasibility Experiment*, Journal of Computational Science 51. { ISSN 1877-7503 } { DOI [10.1016/j.jocs.2021.101324](https://doi.org/10.1016/j.jocs.2021.101324) }, 2021;
7. Tiago Boldt Sousa, Hugo Sereno Ferreira, Filipe Correia, *A Survey on the Adoption of Patterns for Engineering Software for the Cloud*, IEEE Transactions on Software Engineering. { ISSN 1939-3520 } { DOI [10.1109/TSE.2021.3052177](https://doi.org/10.1109/TSE.2021.3052177) }, 2021. { TO APPEAR };
6. Diogo Amaral, Gil Domingues, João Pedro Dias, Hugo Sereno Ferreira, Ademar Aguiar, Rui Nóbrega, Filipe Correia, *Live Software Development Environment Using Virtual Reality: A Prototype and Experiment*, Communications in Computer and Information Science 1172. Springer, Cham, 2019. { ISBN 978-3-030-40222-8 } { DOI [10.1007/978-3-030-40223-5_5](https://doi.org/10.1007/978-3-030-40223-5_5) };
5. Pedro Lourenço, João Pedro Dias, Ademar Aguiar, Hugo Sereno Ferreira, André Restivo, *Experimenting with Liveness in Cloud Infrastructure Management*, Communications in Computer and Information Science 1172. Springer, Cham, 2019. { ISBN 978-3-030-40222-8 } { DOI [10.1007/978-3-030-40223-5_4](https://doi.org/10.1007/978-3-030-40223-5_4) };

4. João Pedro Dias and Ângelo Martins and Hugo Sereno Ferreira, *A Blockchain-based Approach for Access Control in eHealth Scenarios*, Journal of Information Assurance and Security 13(4), pp. 125–136, 2018. [WOS, EMERGING CITATION] { ISSN 1554-1010 };
3. João Pedro Dias and 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, WOS, DBLP] { ISSN 1877-0509 } { DOI [10.1016/J.PROCS.2017.05.355](https://doi.org/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 and 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](https://doi.org/10.4017/GT.2012.11.02.228.00) };
1. Hugo Sereno Ferreira, Ademar Aguiar and 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 international conference proceedings with referee

51. Danny Soares, João Pedro Dias, André Restivo and Hugo Sereno Ferreira, *Programming IoT-spaces: A User-Survey on Home Automation Rules*, Computational Science (ICCS-2020), Lecture Notes in Computer Science 12745. Springer, Cham. { ISBN 978-3-030-77969-6 } { DOI [10.1007/978-3-030-77970-2_39](https://doi.org/10.1007/978-3-030-77970-2_39) }, 2021;
50. Margarida Silva, João Pedro Dias, André Restivo and Hugo Sereno Ferreira, *A Review on Visual Programming for Distributed Computation in IoT*, Computational Science (ICCS-2020), Lecture Notes in Computer Science 12745. Springer, Cham. { DOI [DOI.ORG/10.1007/978-3-030-77970-2_34](https://doi.org/10.1007/978-3-030-77970-2_34) }, 2021;
49. João Pedro Dias, André Restivo, Hugo Sereno Ferreira, *Empowering Visual Internet-of-Things Mashups with Self-Healing Capabilities*, Proceedings of 3rd International Workshop on Software Engineering Research & Practices for the Internet of Things (SERP4IOT-2021) at the 43rd ACM/IEEE International Conference on Software Engineering (ICSE-2021). N/A, Cyberspace, 2021. { **TO APPEAR** };
48. Diogo Campos, André Restivo, Hugo Sereno Ferreira, Afonso Ramos, *Automatic Program Repair as Semantic Suggestions: An Empirical Study*, Proceedings of the 14th IEEE International Conference on Software Testing, Verification and Validation (ICST-2021). Porto de Galinhas, Brazil. { ISBN 978-1-7281-6836-4 } { ISSN 2159-4848 } { DOI [10.1109/ICST49551.2021.00032](https://doi.org/10.1109/ICST49551.2021.00032) }, 2021;

47. João Carlos Ferreira, André Restivo, Hugo Sereno Ferreira, *Automatically Generating Websites From Hand-Drawn Mockups*, Proceedings of the 16th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISAPP-2021). { DOI [10.5220/0010193600480058](#) } { ISBN 978-989-758-488-6 }, 2021;
46. Margarida Silva, João Pedro Dias, André Restivo, Hugo Sereno Ferreira, *Visually-defined Real-Time Orchestration of IoT Systems*, Proceedings of the 17th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (MOBIQUITOUS-2020). Darmstadt, Germany. { DOI [10.1145/3448891.3448938](#) }, 2020. { **TO APPEAR** };
45. João Pedro Dias, Tiago Boldt Sousa, André Restivo, Hugo Sereno Ferreira, *A Pattern-Language for Self-Healing Internet-of-Things Systems*, Proceedings of the 25th European Conference on Pattern Languages of Programs (EUROPLOP-2020). N/A, Cyberspace. { DOI [10.1145/3424771.3424804](#) }, 2020;
44. Diogo Torres, João Pedro Dias, André Restivo, Hugo Sereno Ferreira, *Real-time Feedback in Node-RED for IoT Development: An Empirical Study*, 2020 IEEE/ACM 24th International Symposium on Distributed Simulation and Real Time Applications (DS-RT-2020). N/A, Cyberspace. { ISSN 1550-6525 } { DOI [10.1109/DS-RT50469.2020.9213544](#) }, 2020;
43. Tiago Matias, Filipe Correia, Jonas Fritzsche, Justus Bogner, Hugo Ferreira, André Restivo, *Determining Microservice Boundaries: A Case Study Using Static and Dynamic Software Analysis*, Proceedings of the 14th European Conference on Software Architecture (ECSA-2020). L'Aquila, Italy. { DOI [10.1007/978-3-030-58923-3_21](#) }, 2020;
42. Sara Fernandes, André Restivo, Hugo Sereno Ferreira, Ademar Aguiar, *Helping Software Developers through Live Software Metrics Visualization*, Conference Companion of the 4th International Conference on Art, Science, and Engineering of Programming (PX-2020). Porto, Portugal. { ISBN 9781450375078 } { DOI [10.1145/3397537.3397539](#) }, 2020;
41. André Lago, João Pedro Dias, Hugo Sereno Ferreira, *Conversational Interface for Managing Non-trivial Internet-of-Things Systems*, Computational Science (ICCS-2020), Lecture Notes in Computer Science 12141. Springer, Cham. **★ INVITED FOR EXTENDED VERSION IN JOURNAL ★** { ISBN 978-3-030-50425-0 } { DOI [10.1007/978-3-030-50426-7_29](#) }, 2020;
40. João Pedro Dias, Bruno Lima, João Pascoal Faria, André Restivo, Hugo Sereno Ferreira, *Visual Self-healing Modelling for Reliable Internet-of-Things Systems*, Computational Science (ICCS-2020), Lecture Notes in Computer Science 12141. Springer, Cham. { ISBN 978-3-030-50425-0 } { DOI [10.1007/978-3-030-50426-7_27](#) }, 2020;
39. Hugo Sereno Ferreira, André Restivo, Tiago Boldt, *Towards a Pattern Language for Master's Students*, Proceedings of the 24th European Conference on Pattern Languages of Programs

- (EUROPLOP-2019). Bavaria, Germany. { DOI [10.1145/3361149.3361165](https://doi.org/10.1145/3361149.3361165) } { ISBN 978-1-4503-6206 }, 2019;
38. João Pedro Dias, Tiago Boldt and Hugo Sereno Ferreira, *Testing and Deployment Patterns for the Internet-of-Things*, Proceedings of the 24th European Conference on Pattern Languages of Programs (EUROPLOP-2019). Bavaria, Germany. { DOI [10.1145/3361149.3361184](https://doi.org/10.1145/3361149.3361184) } { ISBN 978-1-4503-6206-1 }, 2019;
 37. Ademar Aguiar, André Restivo, Filipe Correia, Hugo Sereno Ferreira and João Pedro Dias, *Live Software Development — Tightening the feedback loops*, Proceedings of the 5th Edition of the Programming Experience Workshop (PX-2019). Genova, Italy, 2019 [DBLP];
 36. Pedro Lourenço, João Pedro Dias, Ademar Aguiar and Hugo Sereno Ferreira, *CloudCity: A Live Environment for the Management of Cloud Infrastructures*, Proceedings of the 14th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE-2019). Heraklion, Crete, Greece, 2019. ★ INVITED FOR EXTENDED VERSION IN JOURNAL ★ [SCOPUS, DBLP] { DOI [10.5220/0007699700270036](https://doi.org/10.5220/0007699700270036) };
 35. Diogo Amaral, Gil Domingues, João Pedro Dias, Hugo Sereno Ferreira, Ademar Aguiar and Rui Nobrega, *Live Software Development Environment for Java using Virtual Reality*, Proceedings of the 14th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE-2019). Heraklion, Crete, Greece, 2019. ★ INVITED FOR EXTENDED VERSION IN JOURNAL ★ [SCOPUS, DBLP] { DOI [10.5220/0007699800370046](https://doi.org/10.5220/0007699800370046) };
 34. João Pedro Dias, Luis Reis, Angelo Martins and Hugo Sereno Ferreira, *A Blockchain-based Scheme for Access Control in e-Health Scenarios*, Proceedings of the 14th International Conference on Information assurance and security (IAS-2018). Porto, Portugal, 2018. ★ INVITED FOR EXTENDED VERSION IN JOURNAL ★ [WOS, SCOPUS, DBLP] { DOI [10.1007/978-3-030-17065-3_24](https://doi.org/10.1007/978-3-030-17065-3_24) };
 33. Guilherme Pinto, João Pedro Dias and Hugo Sereno Ferreira, *Blockchain-based PKI for Crowdsourced IoT Sensor Information*, Proceedings of the 14th International Conference on Information assurance and security (IAS-2018). Porto, Portugal, 2018. [SCOPUS, DBLP] { DOI [10.1007/978-3-030-17065-3_25](https://doi.org/10.1007/978-3-030-17065-3_25) };
 32. Angela Cardoso, Armando Sousa and Hugo Sereno Ferreira, *Programming for Young Children using Tangible Tiles and Camera-Enabled Handheld Devices*, Proceedings of the 11th annual International Conference of Education, Research and Innovation (ICERI-2018). Seville, Spain, 2018. [WOS] { DOI [10.21125/ICERI.2018.2504](https://doi.org/10.21125/ICERI.2018.2504) } { ISBN 978-84-09-05948-5 } { ISSN 2340-1095 };
 31. Angela Cardoso, Armando Sousa and Hugo Sereno Ferreira, *Easy Robotics with Camera Devices and Tangible Tiles*, Proceedings of the 11th annual International Confer-

- ence of Education, Research and Innovation (ICERI-2018). Seville, Spain, 2018. [WOS] { DOI [10.21125/ICERI.2018.2506](https://doi.org/10.21125/ICERI.2018.2506) } { ISBN 978-84-09-05948-5 } { ISSN 2340-1095 };
30. Duarte Pinto, João Pedro Dias and Hugo Sereno Ferreira, *Dynamic Allocation of Serverless Functions in IoT Environments*, Proceedings of the 16th IEEE International Conference on Embedded and Ubiquitous Computing (EUC-2018). Bucharest, Romania, 2018. [SCOPUS, WOS, DBLP] { DOI [10.1109/EUC.2018.00008](https://doi.org/10.1109/EUC.2018.00008) };
 29. Tiago Boldt Sousa, Hugo Sereno Ferreira and Filipe Correia, *Overview of A Pattern Language for Engineering Software for the Cloud*, Proceedings of the 25th Conference on Pattern Languages of Programs (PLOP-2018). Portland, USA, 2018;
 28. Tiago Boldt, Hugo Sereno Ferreira, Filipe Correia and Ademar Aguiar, *Engineering Software for the Cloud: Automated Recovery and Scheduler*, Proceedings of the 23rd European Conference on Pattern Languages of Programs (EUROPLOP-2018). Bavaria, Germany, 2018. [SCOPUS, DBLP] { DOI [10.1145/3282308.3282315](https://doi.org/10.1145/3282308.3282315) } { ISBN 978-1-4503-6387-7 };
 27. Tiago Boldt, Hugo Sereno Ferreira, Filipe Correia and Ademar Aguiar, *Engineering Software for the Cloud: External Monitoring and Failure Injection*, Proceedings of the 23rd European Conference on Pattern Languages of Programs (EUROPLOP-2018). Bavaria, Germany, 2018. [SCOPUS, DBLP] { DOI [10.1145/3282308.3282316](https://doi.org/10.1145/3282308.3282316) } { ISBN 978-1-4503-6387-7 };
 26. João Pedro Dias, Flávio Couto, Ana Paiva and Hugo Sereno Ferreira, *A Brief Overview of Existing Tools for Testing the Internet-of-Things*, Proceedings of the 11th IEEE Conference on Software Testing, Validation and Verification Workshops (ICSTW-2018). Västerås, Sweden, 2018. [WOS, SCOPUS, DBLP] { DOI [10.1109/ICSTW.2018.00035](https://doi.org/10.1109/ICSTW.2018.00035) };
 25. João Pedro Dias, João Pascoal Faria, Hugo Sereno Ferreira, *A Reactive and Model-based Approach for Developing Internet-of-Things Systems*, Proceedings of the 7th Software Engineering Doctoral Symposium (SEDES-2018), co-located with the 11th International Conference on the Quality of Information and Communications Technology (QUATIC-2018). Coimbra, Portugal, 2018. [WOS, SCOPUS, DBLP] { DOI [10.1109/QUATIC.2018.00049](https://doi.org/10.1109/QUATIC.2018.00049) };
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 23. Tiago Boldt Sousa, Hugo Sereno Ferreira, Filipe Figueiredo Correia and Ademar Aguiar, *Engineering Software for the Cloud: Messaging Systems and Logging*, Proceedings of the 22nd European Conference on Pattern Languages of Programs (EUROPLOP-2017). Bavaria, Germany, 2017. [SCOPUS, DBLP] { DOI [10.1145/3147704.3147720](https://doi.org/10.1145/3147704.3147720) };
 22. Duarte Duarte, Hugo Sereno Ferreira, João Dias and Zafeiris Kokkinogonis, *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. [SCOPUS, DBLP] { DOI [10.1007/978-3-319-61578-3_3](https://doi.org/10.1007/978-3-319-61578-3_3) };
21. Tiago Sousa, Hugo Sereno Ferreira and 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 and 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 Correia and Hugo Sereno Ferreira, *Patterns for software orchestration on the cloud*, Proceedings of the 22nd Conference on Pattern Languages of Programs (PLOP-2015). Pittsburgh, Pennsylvania, USA, 2015. { ISBN 978-1-941652-03-9 };
 18. Omar Castro, Hugo Sereno Ferreira and 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. [WOS, DBLP, SCOPUS] { DOI [10.1007/978-3-319-10831-5_30](https://doi.org/10.1007/978-3-319-10831-5_30) };
 17. Nuno Flores, Ademar Aguiar and 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](https://doi.org/10.1145/2593702.2593713) };
 16. Bruno Ferreira, Vânia Guimarães and 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](https://doi.org/10.1109/HEALTHCOM.2013.6720755) };
 15. Tiago Boldt Sousa and 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 ★ [WOS, DBLP, SCOPUS] { DOI [10.1109/QUATIC.2012.43](https://doi.org/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 and 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. [WOS, SCOPUS] { ISSN 1558-4615 } { DOI [10.1109/EMBC.2012.6347145](https://doi.org/10.1109/EMBC.2012.6347145) };
13. Hugo Sereno Ferreira, Tiago Sousa and 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. [WOS, DBLP, SCOPUS] { DOI [10.1007/978-3-642-32609-7_11](https://doi.org/10.1007/978-3-642-32609-7_11) };
 12. Tiago Almeida, Hugo Sereno Ferreira and 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. [WOS, DBLP, SCOPUS] { DOI [10.1007/978-3-642-32609-7_22](https://doi.org/10.1007/978-3-642-32609-7_22) };
 11. Patricia Matsumoto, Eduardo Guerra, Hugo Sereno Ferreira, Filipe Correia, Joseph Yoder and 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](https://doi.org/10.1145/2578903.2579150) };
 10. Hugo Sereno Ferreira, Filipe Correia, Ademar Aguiar and 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 and 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](https://doi.org/10.1145/2493288.2493290) };
 8. Marco Cunha, Ana Paiva, Hugo Sereno Ferreira and Rui Abreu, *PETTool: A Pattern-Based GUI Testing Tool*, 2nd International Conference on Software Technology and Engineering (ISCSTE-2010). Puerto Rico, USA, 2010. [SCOPUS] { DOI [10.1109/ICSTE.2010.5608882](https://doi.org/10.1109/ICSTE.2010.5608882) };
 7. Gabriela Soares, Rosaldo Rossetti, Nuno Flores, Ademar Aguiar and 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. [WOS, DBLP, SCOPUS] { DOI [10.1007/978-3-642-04265-2_28](https://doi.org/10.1007/978-3-642-04265-2_28) };
 6. António Rito Silva, David Martinho, Ademar Aguiar, Nuno Flores, Filipe Correia and 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 and 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 and 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](https://doi.org/10.1145/1943226.1943241) };
3. Filipe Correia, Hugo Sereno Ferreira, Nuno Flores and 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](https://doi.org/10.1145/1641309.1641352) };
2. Hugo Sereno Ferreira, Ademar Aguiar and 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** ★ [WOS, DBLP, SCOPUS] { DOI [10.1109/ICSEA.2009.83](https://doi.org/10.1109/ICSEA.2009.83) };
1. Hugo Sereno Ferreira, Filipe Correia and 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](https://doi.org/10.1145/1753196.1753203) }.

2.1.4 Papers in national conference proceedings with scientific referee

2. Luís Fonseca, Tiago Boldt Sousa and 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 Pre-prints

6. Andreia Rodrigues, Jose Pedro Silva, Joao Pedro Dias, Hugo Sereno Ferreira, *Multi-Approach Debugging of Industrial IoT Workflows*, ARXIV:2009.05828 [CS.SE], 2020. [DBLP].
5. Guilherme Pinto, João Pedro Dias and Hugo Sereno Ferreira, *Blockchain-based PKI for Crowdsourced IoT Sensor Information*, ARXIV:1807.03863 [CS.CR], 2018. [DBLP].
4. Duarte Pinto, João Pedro Dias and Hugo Sereno Ferreira, *Dynamic Allocation of Serverless Functions in IoT Environments*, ARXIV:1807.03755 [CS.DC], 2018. [DBLP].

3. João Pedro Dias, Luís Reis, Hugo Sereno Ferreira and Ângelo Martins, *Blockchain for Access Control in e-Health Scenarios*, ARXIV:1805.12267 [CS.CR], 2018. [DBLP].
2. João Bernardino, Luís Filipe Teixeira and Hugo Swreno Ferreira, *Bio-Measurements Estimation and Support in Knee Recovery through Machine Learning*, ARXIV:1807.07521 [CS.CV], 2018. [DBLP].
1. André Sousa Lago and Hugo Sereno Ferreira, *Conversation-Based Complex Event Management in Smart-Spaces*, ARXIV:1807.07047 [CS.HC], 2018. [DBLP].

2.1.6 Other scientific production

6. Filipa Barros, Luís Sousa, João Pedro Dias and Hugo Sereno Ferreira, *A Preliminary Study on Mesh Networks and IoT*, 11^a Edição Encontro Investigação Jovem (IJUP-2018). Porto, Portugal, 2018;
5. João Pedro Dias and Hugo Sereno Ferreira, *Automating the Extraction of Static Content and Dynamic Behaviour from e-Commerce Websites*, 10^a Edição Encontro Investigação Jovem (IJUP-2017). Porto, Portugal, 2017;
4. João Silva and Hugo Sereno Ferreira, *Bluetooth Based Warning System for Ambient Assisted Living*, 9^a Edição Encontro Investigação Jovem (IJUP-2016). Porto, Portugal, 2016;
3. Filipe Correia, Nuno Flores, Hugo Sereno Ferreira and 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 and 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](https://doi.org/10.1145/1921532.1960273) }.

2.2 SCIENTIFIC PROJECTS

I have participated in a total of 10 scientific projects, funded by national (5) and European (5) R&D agencies and programmes, including 2 military R&D projects (§ 4.4, p. 51) and 2 projects funded by SIFIDE (§ 4.5, p. 51)². An additional 8 software development projects can be found in (§ 4.6, p. 52).

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

2.2.1 Research Projects

In most of the following projects, my main contribution was that of an expert in *Large-Scale Software Architecture* and *Edge/Cloud Computing*, by having the responsibility of tackling non-functional quality attributes associated with a *scalable solution*. I was also responsible for supervising researchers in all projects.

6. WoF (Warehouse of the Future)

Since April 2021. *Senior Researcher*, FEUP

The Smart Warehouse paradigm bring emerging technologies from Industry 4.0 to provide total automation, integration and digitalization of logistics and intralogistics flows in mass-production systems. The Warehouse of the Future (WoF) project is born from a consortium that aims to develop highly flexisble solutions based on the sensorization of people, equipment and inventory, with real-time management of stabilization, picking and movement of components/materials. This project is performing a live, large-scale experimentation using the automotive industry (PSA Mangualde Shop Floor) with three R&D solutions, *viz.* (a) a *pick-to-light* wireless, mesh system, with high dependability, flexibility and rastreability, (b) new automated picking solutions using colaborative robotics and computer vision, and (c) real-time monitorization and optimization systems for “green” components. My main contribution has been the supervision of researchers in improving global system’s dependability via self-healing and relocatable computing.

5. iReceptor+

Since September 2020. *Senior Researcher*, INESC TEC

The international iReceptor Plus consortium aims to promote human immunological data storage, integration and controlled sharing for a wide range of clinical and scientific purposes. The four-year project, which is co-funded by the EU and Canadian government, aims to develop an innovative platform to integrate distributed repositories of Adaptive Immune Receptor Repertoire sequencing (AIRR-seq) data. My contribution has been the supervision of researchers in building an extensible framework for Federated Learning.

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 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 12 editions of periodics, 33 international conferences, 5 national conferences, and 2 books. Along with the 42 examining comit-

tees and 15 organizations of scientific events, it totals 109 interventions in scientific and professional communities, averaging 9 per year.

2.3.1 Reviewer for international scientific journals

12. MDPI Sensors (Impact Factor 3.28) SENSORS. 2021;
11. Software Testing, Verification and Reliability (Impact Factor 1.23) STVR. 2021;
10. IEEE Internet of Things Journal (Impact Factor 5.9), IEEE IOT. 2020;
9. ACM Transactions on Internet of Things ACM TIOT. 2020;
8. Future Internet Journal (Impact Factor 2.03) MDPI OPEN ACCESS. 2019;
7. Language and Law=Linguagem e Direito. 2019;
6. IEEE Transactions on Services Computing (Impact Factor 4.4), IEEE TSC. 2019;
5. IEEE Transactions on Services Computing (Impact Factor 4.4), IEEE TSC. 2018;
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 TSE. 2012;
1. IEEE Software (Impact Factor 0.8). 2011.

2.3.2 Reviewer and Member of Technical Committees in International Conferences

33. <Co-chair> 25th International Symposium on Distributed Simulation and Real Time Applications (DS-RT 2021) Special Session on Real-Time Simulations;
32. <PC> 26th European Conference on Pattern Languages of Programs (EUROPLOP 2021);
31. <PC> 14th International Conference on Mobile Ubiquitous Computing, Systems, Services and Technologies (UBICOMM 2020);
30. <PC> 25th European Conference on Pattern Languages of Programs (EUROPLOP 2020);
29. <Reviewer> 2020 Winter Conference on Applications of Computer Vision (WACV 2020);
28. <PC> 13th International Conference on Mobile Ubiquitous Computing, Systems, Services and Technologies (UBICOMM 2019);
27. <PC> 24th European Conference on Pattern Languages of Programs (EUROPLOP 2019);
26. <PC> 20th International Conference on Agile Software Development (XP 2019);
25. <PC> 19th International Conference on Agile Software Development (XP 2018);

24. $\langle \text{PC} \rangle$ 9th Brazilian Workshop on Agile Methods (WBMA @ AGILE BRAZIL 2018);
23. $\langle \text{Reviewer} \rangle$ 22nd European Conference on Pattern Languages of Programs (EUROPLOP 2017);
22. $\langle \text{PC} \rangle$ 8th Agile Portugal (APT 2017);
21. $\langle \text{PC} \rangle$ 8th Brazilian Workshop on Agile Methods (WBMA @ AGILE BRAZIL 2017);
20. $\langle \text{PC} \rangle$ 7th Brazilian Workshop on Agile Methods (WBMA @ AGILE BRAZIL 2016);
19. $\langle \text{PC} \rangle$ 6th Brazilian Workshop on Agile Methods (WBMA @ AGILE BRAZIL 2015);
18. $\langle \text{PC} \rangle$ 10th Latin-American Conf. on Pattern Languages of Prog. (SUGARLOAFPLOP 2014);
17. $\langle \text{PC} \rangle$ Software Engineering and Science track at the 6th Symposium on Informatics. (SOFT-PT @ INFORUM 2014);
16. $\langle \text{PC} \rangle$ 9th Int. Conf. on the Quality of Information and Communications Tech. (QUATIC 2014);
15. $\langle \text{PC} \rangle$ Workshop of Agile Software Development Techniques at the 14th International Conference on Computational Science and its Applications (ICCSA 2014);
14. $\langle \text{Reviewer} \rangle$ 18th European Conference on Pattern Languages of Programs (EUROPLOP 2013);
13. $\langle \text{PC} \rangle$ 5th Int. Workshop on Flexible Modeling Tools (FLEXITools @ SPLASH 2013);
12. $\langle \text{PC} \rangle$ MiniPloP Brasil IME/USP. 2013;
11. $\langle \text{PC} \rangle$ Wavefront Experience at the 4th annual SPLASH conference. 2013;
10. $\langle \text{Reviewer} \rangle$ 19th Conference on Pattern Languages of Programs (PLOP 2012);
9. $\langle \text{PC} \rangle$ 8th Int. Conf. on the Quality of Information and Communications Tech. (QUATIC 2012);
8. $\langle \text{Reviewer} \rangle$ 16th European Conference on Pattern Languages of Programs (EUROPLOP 2011);
7. $\langle \text{Reviewer} \rangle$ 18th Conference on Pattern Languages of Programs (PLOP 2011);
6. $\langle \text{PC} \rangle$ 2nd International Summer School on Domain Specific Modeling. 2011;
5. $\langle \text{PC} \rangle$ Model Driven Engineering (ECM/MDE, INFORUM 2011);
4. $\langle \text{PC} \rangle$ MiniPloP Brasil IME/USP. 2011;
3. $\langle \text{PC} \rangle$ 6th Int. Conf. on the Quality of Information and Communications Tech. (QUATIC 2010);
2. $\langle \text{Reviewer} \rangle$ 15th European Conference on Pattern Languages of Programs (EUROPLOP 2010);
1. $\langle \text{Reviewer} \rangle$ 17th Conference on Pattern Languages of Programs (PLOP 2010).

2.3.3 Member of committees of national conferences

5. 16th edition of the Doctoral Symposium in Informatics Engineering (DSIE 2021). FEUP;
4. 15th edition of the Doctoral Symposium in Informatics Engineering (DSIE 2020). FEUP;
3. 14th edition of the Doctoral Symposium in Informatics Engineering (DSIE 2019). FEUP;
2. 13th edition of the Doctoral Symposium in Informatics Engineering (DSIE 2018). FEUP;
1. 7th edition of the Doctoral Symposium in Informatics Engineering (DSIE 2012). FEUP;

2.3.4 Conference organization

Besides being part of the aforementioned *program committees* (§ 2.3.2, p. 18), I have also participated in the organization of **15 scientific events**, out of which **4 programming marathons**³ and **2 as a student volunteer**.

15. **Steering Committee** 9th Edition of the Student Organized Tech Conference (TALK-A-BIT 2021). Porto, Portugal;
14. **Steering Committee** 8th Edition of the Student Organized Tech Conference (TALK-A-BIT 2020). Porto, Portugal;
13. **Steering Committee** 7th Edition of the Student Organized Tech Conference (TALK-A-BIT 2019). Porto, Portugal;
12. **Research Posters Co-Chair** 19th International Conference on Agile Software Development (XP 2018);
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;
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;

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.

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 book⁴.

2. **Duncan K. DeVore, Sean Walsh, and Brian Hanafée**, *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 42 **examining committees** (15 external to FEUP), out of which 27 as **chair**, 41 M.Sc. and 1 Ph.D., averaging 4.6 **examinations per year**, excluding direct supervisions as detailed in (§ 2.4, p. 26):

42. **Chair**. João Furriel Pinheiro, *Internet of Things Software Modules Marketplace*. Supervisor: Prof. Gil Gonçalves. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020;
41. **Chair**. Carlos Miguel Freitas, *Autonomous navigation with simultaneous localization and mapping in/outdoor*. Supervisor: Prof. Armando Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020;

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.

40. **Chair.** José Nuno Freixo, *Simulating and upgrading PiGaming Mixed Reality setup with Artificial Intelligence*. Supervisor: Prof. Armando Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020;
39. **Examiner.** Luís Carlos Marques, *Reengenharia de um sistema de software de gestão e rastreabilidade logística*. Supervisor: Prof. João Miguel Fernandes. Master in Informatics Engineering. University of Minho. 2019;
38. **Examiner.** João Tiago Gomes, *Desenvolvimento de segurança e automatização de atualizações numa arquitetura de micro-serviços*. Supervisor: Prof. João Miguel Fernandes. Master in Informatics Engineering. University of Minho. 2019;
37. **Examiner.** Miguel Amaral, *Time-memory trade-off in graphlet counting & Orbit vertex frequency vs. degree in the expected degree model*. Supervisor: Prof. Pedro Ribeiro. Master in Computer Science. Faculty of Sciences, University of Porto (FCUP). 2019;
36. **Examiner.** Pedro Abranches Carvalho, *Gaussian Processes for Automatic Optimization of Spinal Electrical Stimulation*. Supervisor: Prof. Pedro Ribeiro. Master in Computer Science. Faculty of Sciences, University of Porto (FCUP). 2019;
35. **Examiner.** João Ribeiro Costa, *Design Patterns for Ethereum Smart Contracts*. Supervisor: Prof. Isabel Azevedo. Master in Informatics Engineering. Polytechnic of Porto - School of Engineering (ISEP). 2019;
34. **Chair.** Ana Bárbara Casimiro, *Portal de Outsourcing*. Supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019;
33. **Chair.** Filipe Miguel Ribeiro, *Writing Efficient JavaScript Programs: a Performance and Optimization study*. Supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019;
32. **Examiner.** Carlos Silva, *Event-driven integrado com Enterprise Service Bus*. Supervisor: Prof. Paulo Maio. Master in Informatics Engineering. Polytechnic of Porto - School of Engineering (ISEP). 2018;
31. **Examiner.** Pedro Lopes, *Ethereum Smart Contracts for Educational Certificates*. Supervisor: Prof. Isabel Azevedo. Master in Informatics Engineering. Polytechnic of Porto - School of Engineering (ISEP). 2018;
30. **Chair.** João Carvalho, *Audição Musical Afetiva: Recurso a expressões faciais para recomendação musical*. Supervisor: Prof. Matthew Davies. Master in Multimedia (MM). Faculty of Engineering, University of Porto (FEUP). 2018;

29. **Examiner.** Ricardo Santos, *Suporte à Evolução de API*. Supervisor: Prof. Nuno Bettencourt. Master in Informatics Engineering. Polytechnic of Porto - School of Engineering (ISEP). 2018;
28. **Examiner.** Pedro Lopes, *Criação e Evolução de uma API Pública*. Supervisor: Prof. Isabel Azevedo. Master in Informatics Engineering. Polytechnic of Porto - School of Engineering (ISEP). 2018;
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;
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](https://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](https://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](https://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. { [HDL.HANDLE.NET/10216/110193](https://hdl.handle.net/10216/110193) };

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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://hdl.handle.net/10216/66386) }.

2.4 SCIENTIFIC SUPERVISION OF INDIVIDUALS AND TEAMS

Since 2009, I have been (co-)supervisor of **68 M.Sc.** dissertations (§ 2.4.3, p. 27), **2 Ph.D.** thesis (§ 2.4.2, p. 27), **2 undergraduate** projects (§ 2.4.4, p. 34) and **4 scholarships** (§ 2.4.1, p. 26), totaling **76 supervisions** and averaging at **7 supervisions per year** for the past 11 years. About 1 in 3 ($\approx 33\%$) are collaborations with colleagues as co-supervisor. Further breakdown can be found in Table 2.2 and Table 2.3 (p. 27).

	ONGOING (CO-)	FINISHED (CO-)	TOTAL (CO-)
UNDERGRADUATE	—	2 (2)	2 (2)
M.SC.	10 (6)	59 (17)	69 (24) /2
PH.D.	1	1	2
SCHOLARSHIPS	1	4	4
TOTAL	12 (6)	65 (19)	77 (27) /2

Table 2.2: Detailed summary of type of supervision since 2009. Numbers inside parenthesis represent co-supervisions. Suspended supervisions appear after the slash (/).

2.4.1 Supervision of Researchers

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

5. **João Pedro Dias**, FCT Doctoral Research grant. Initial duration: 24mo, renewable. *cf.* *SFRH-BD-144612-2019*. 2019—;
4. **João Pedro Dias**, Research grant at INESC TEC. Initial duration: 12mo, renewable. Project: *NanoSTIMA Research Line 3-2*, *cf.* *AE2017-0051*. 2017—2019;
3. **Luís Brochado Reis**, Research grant at INESC TEC. Duration: 8mo. Project: *NanoSTIMA Research Line 3-2*, *cf.* *NC2017-0250*. 2017—2018;
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**, *A Live Approach for Developing Internet-of-Things Systems*. Main Scientific Area: *Software Engineering, Internet-of-Things*. Co-supervisor: Prof. Pascoal Faria. Doctoral Programme in Informatics (PRODEI), Faculty of Engineering, University of Porto. 2017—2021 (*Expected*);
1. **Tiago Boldt Sousa**, *Engineering Software for the Cloud: A Pattern Language*. Main Scientific Area: *Software Engineering, Cloud Computing*. Co-supervisor: Prof. Filipe Correia. Doctoral Programme in Informatics (PRODEI), Faculty of Engineering, University of Porto. 2011—2020.

2.4.3 Supervision of Master and Integrated Master Students

Most of my supervisions ($\approx 87\%$) are on the Integrated Master Students on Informatics and Computation Engineering (MIEIC). About 1 in 3 ($\approx 33\%$) are collaborations with colleagues as co-supervisor. Most of these dissertations are pursued in an academic context (*i.e.* within the institution that confers the degree). 17 ($\approx 25\%$) took place at companies/external institutions; these include: Amazon, Fraunhofer AICOS, Farfetch, Mailcube, ShiftForward, Blip, INESC TEC, Critical Manufacturing, Critical Software, Tecla Colorida, Siemens, and Scionis. More details can be found in Table 2.3.

DEGREE	ONGOING (CO-)	SUSPENDED (CO-)	FINISHED (CO-)	TOTAL (CO-)
MIEIC	10 (6)	1	51 (14)	62 (20)
MESW	—	1 (1)	5 (3)	6 (4)
MM	—	—	1	1
MIEEC	—	—	2	2
TOTAL	10 (6)	2 (1)	59 (17)	71 (24)

Table 2.3: Detailed summary of M.Sc. supervisions since 2009 at Faculty of Engineering, University of Porto (FEUP). Numbers inside parenthesis represent co-supervisions.

70. **Guilherme Fonseca da Silva**, *Visually-Defined Chaos Engineering for IoT*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2021—22 (estimated);
69. **Pedro Silva**, *Automated Generic Optimization using Mutation Operators*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);

68. **Amadeu Prazeres Pereira**, *Empirical Study on Live Automatic Program Repair*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
67. **João Barbosa**, *Integrating Automated Program Repair with SDLC*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
66. **Henrique Lima**, *Change Interpretation Techniques for Safe, User-Friendly Continuous Deployment in IaC at AMAZON*. Main supervisor: Prof. Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
65. **Pedro Costa**, *Decentralized Real-time IoT Orchestration*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
64. **Tiago Fragoso**, *Dynamic Real-time IoT Orchestration*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
63. **Nuno Lopes**, *IoT for industry 4.0 at FRAUNHOFER*. Co-supervisor: Prof. Tiago Boldt Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
62. **Rui Guedes**, *Informed Search Strategies for Property Based Testing*. Co-supervisor: André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
61. **Tiago Araújo Castro**, *Statistical Analysis in Property Based Testing*. Main supervisor: André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2020—21 (estimated);
60. **Afonso Ramos**, *Property tests as specifications towards better code completion*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;
59. **José Pedro Borges**, *Live Acceptance Testing using Behavior Driven Development*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;
58. **Luis Saraiva**, *A Conversational Interface for Webpage Code Generation*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;

57. **Danny Almeida Soares**, *Model-to-Model Mapping of Semi-Structured Specifications to Visual Programming Languages*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;
56. **Miguel Ramalho**, *High-level Approaches to Detect Malicious Political Activity on Twitter*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;
55. **Ana Margarida Silva**, *Orchestration for Automatic Decentralization in Visually-defined IoT*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;
54. **Bárbara Sofia Silva**, *Automatic Generation of Synthetic Website Wireframe Datasets from Source Code*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;
53. **Ivo Amaro**, *A Visual Language for Human-to-Human and Human-Computer Interaction*. Co-supervisor: Prof. Miguel Carvalhais. Master in Multimedia (MM). Faculty of Engineering, University of Porto (FEUP). 2019—20;
52. **Diogo Torres**, *Increasing the feedback on IoT development in Node-RED*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2019—20;
51. **Mário Fernandes**, *A Live IDE for Deep Learning Architectures*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2018—19;
50. **Bernardo Belchior**, *Testing in IoT systems: From Simulation to Visual-based Testing*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2018—19;
49. **Andreia Rodrigues**, *IIoT Remote Debugger*. Co-supervisor: Eng. João Pedro Dias. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2018—19;
48. **Pedro Costa**, *Trustable oracles towards trustable blockchains*. Main supervisor: Prof. Filipe Correia. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2018—19;
47. **Renato Abreu**, *An Extensible Framework for Smart Environment Simulations for IoT*. Co-supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2018—19;

46. **Nuno Adrego**, *A Systematic Approach for Adopting Pattern Languages: A Study on Cloud Practices*. Co-supervisor: Prof. Filipe Correia. Integrated Master in Electrical and Computer Engineering (MIEEC). Faculty of Engineering, University of Porto (FEUP). 2018—19;
45. **João Ferreira**, *Live web prototypes from hand-drawn mockups*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2018—19;
44. **Diogo Campos**, *Tests as Specifications towards better Code Completion*. Main supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2018—19;
43. **Tiago Matias**, *Streamlined Refactoring of Modern Web Frameworks to Microservices*. Main supervisor: Prof. Filipe Correia. Master in Software Engineering (MESW). Faculty of Engineering, University of Porto (FEUP). 2018—19;
42. **Luís Melo**, *Towards a Live IDE Infrastructure for Deep Learning*. Main supervisor: Prof. André Restivo. Master in Software Engineering (MESW). Faculty of Engineering, University of Porto (FEUP). 2018—19 (*Suspended*);
41. **Ângela Cardoso**, *Tangible language for educational programming of robots and other targets*. Main supervisor: Prof. Armando Sousa. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—19. { [HDL.HANDLE.NET/10216/119132](https://hdl.handle.net/10216/119132) };
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. { [HDL.HANDLE.NET/10216/114084](https://hdl.handle.net/10216/114084) };
39. **Flávio Couto**, *Framework for Multi-Agent Smart-Space Simulator*. Co-Supervisor: Prof. André Restivo. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18. { [HDL.HANDLE.NET/10216/74653](https://hdl.handle.net/10216/74653) };
38. **Guilherme Pinto**, *BlockChain as a PKI for Ownership Control of IoT Devices*. Co-Supervisor: Eng. João Pedro Dias. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18. { [HDL.HANDLE.NET/10216/114144](https://hdl.handle.net/10216/114144) };
37. **António Ramadas**, *Smart-Homes Activity Pattern Recognition: A Comparative Study*. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18. { [HDL.HANDLE.NET/10216/114124](https://hdl.handle.net/10216/114124) };
36. **João Bernardino**, *Bio-Measurements Estimation and Support in Knee Recovery through Machine Learning*. Co-Supervisor: Prof. Luis Teixeira. Integrated Master in Informatics and

- Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18. { [HDL.HANDLE.NET/10216/114085](https://hdl.handle.net/10216/114085) };
35. **Duarte Pinto**, *Serverless Architectural design for IoT*. Co-Supervisor: Eng. João Pedro Dias. Integrated Master in Informatics and Computation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2017—18. { [HDL.HANDLE.NET/10216/114149](https://hdl.handle.net/10216/114149) };
 34. **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—18;
 33. **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;
 32. **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;
 31. **Marco Rodrigues**, *An Empirical Study of Open Source Software Adoption*. Master in Software Engineering (MESW). Faculty of Engineering, University of Porto (FEUP). 2017—18. { [HDL.HANDLE.NET/10216/114098](https://hdl.handle.net/10216/114098) };
 30. **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;
 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;
 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. { [HDL.HANDLE.NET/10216/111211](https://hdl.handle.net/10216/111211) };
 27. **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. { [HDL.HANDLE.NET/10216/118162](https://hdl.handle.net/10216/118162) };
 26. **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— (*Suspended*);

25. **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](https://hdl.handle.net/10216/105951) };
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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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](https://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 Compu-

- tation Engineering (MIEIC). Faculty of Engineering, University of Porto (FEUP). 2012—13. { [HDL.HANDLE.NET/10216/66919](https://hdl.handle.net/10216/66919) };
6. **Tiago Almeida**, *End-User Programming In Mobile Devices through Reusable 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](https://hdl.handle.net/10216/65656) };
 5. **Jorge Mateus**, *Agile Business Intelligence Using Microsoft® SharePoint* at CRITICAL MANUFACTURING, S.A. 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](https://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](https://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](https://hdl.handle.net/10216/62128) }.

2.4.4 Supervision of Undergraduate Students

The following were undergraduate researchers that pursued their final *Bachelor's* degree project at INESC 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

3.1	Teaching activity	36
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I have been a teacher since 2008 of **23 different curricular units** (the vast majority classified under the *Software Engineering* domain) in **4 different institutions**, **19** at FEUP (§ 3.1, p. 36), and **7 (co-)coordinations** so far. I have also participated in the creation of **4 curricular units** (§ 3.3, p. 44) and **1 master degree** (§ 3.2, p. 44). Of particular relevance, is the **2 self-assessment committees** that conferred the EUR-ACE and A3ES accreditations for MIEIC (§ 3.4, p. 47). I have also participated in **5 editions of *Universidade Júnior***, I am the **head of the MIEIC student's laboratory**, and a former **ACM ICPC trainer** (international collegiate programming contest) of FEUP teams (§ 3.5, p. 48).

3.1 TEACHING ACTIVITY

3.1.1 Production of Pedagogical Material

All **14 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 *Laws of Software Engineering* with Prof. Pascoal Faria { <https://www.slideshare.net/bytter/soft-eng-laws> }.

3.1.2 School year 2020/2021

Coordinator of *Information Systems and Software Engineering Seminar* and *Software Development Laboratory*, thus **(coordinating 2 curricular units, all classified under the Software Engineering domain.**

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK
MIEIC	4Y 1S	7.5	Software Development Laboratory	Coordinator	2T + 6P
MIEIC	4Y 2S	7.5	Project Management Laboratory	Instructor	3P
MIEIC	2Y 2S	6	Object-Oriented Programming Lab.	Instructor	3TP
MIEIC	5Y 1S	6	Inf. Sys. and Software Eng. Seminar	Coordinator	3TP
—	—	27	Total: 4	—	8.5/term

Table 3.1: Summary table for the school year 2019/2020 at FEUP.

3.1.3 School year 2019/2020

Coordinator of *Information Systems and Software Engineering Seminar* and *Software Development Laboratory*, thus **(coordinating 2 curricular units, all classified under the Software Engineering domain. The last time I had a teaching service within the expected limit of 9h/term was back in 2010/11, with obvious (and measurable) consequences to my research activities.**

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK
MIEIC	4Y 1S	7.5	Software Development Laboratory	Coordinator	2T + 6P
MIEIC	4Y 2S	7.5	Project Management Laboratory	Instructor	3P
MIEIC	2Y 2S	6	Object-Oriented Programming Lab.	Instructor	3TP
MIEIC	5Y 1S	6	Inf. Sys. and Software Eng. Seminar	Coordinator	3TP
—	—	27	Total: 4	—	8.5/term

Table 3.2: Summary table for the school year 2019/2020 at FEUP.

3.1.4 School year 2018/2019

Coordinator of *Information Systems and Software Engineering Seminar*, *Software Engineering Seminars*, *Software Development Laboratory*, and *Cloud and Service Oriented Comput-*

ing, thus **coordinating 5 curricular units**, all classified under the *Software Engineering* domain.

COURSE	TERM	ECTS	CURRICULAR UNIT	ROLE	H/WEEK
MESW	2Y 1S	6	Cloud and Service Oriented Computing	Coordinator	3TP
MESW	2Y 1S	6	Software Engineering Seminars	Coordinator	3TP
MIEIC	4Y 1S	7.5	Software Development Laboratory	Coordinator	2T + 3P
MIEIC	4Y 2S	7.5	Project Management Laboratory	Instructor	3P
MIEIC	4Y 2S	6	Software Systems Architecture	Coordinator	3TP
MIEIC	5Y 1S	6	Inf. Sys. and Software Eng. Seminar	Coordinator	3TP
—	—	39	Total: 6	—	10/term

Table 3.3: Summary table for the school year 2018/2019 at FEUP.

3.1.5 School year 2017/2018

(Co-)coordinator of *Information Systems and Software Engineering Seminar*, *Software Engineering Seminars*, *Software Development Laboratory*, *Cloud and Service Oriented Computing* and *Dissertation Planning*, thus **(co-)coordinating 5 curricular units**. This is also the **1st editions of 2 curricular units**, viz. (i) *Cloud and Service Oriented Computing* (§ 3.3.1, p. 45), and (ii) *Software Engineering Seminars* (§ 3.3.2, p. 45). Most are classified under the *Software Engineering* domain, except *FEUP Project* (Personal and Interpersonal Skills), *Object-Oriented Programming Laboratory* (Programming), and *Dissertation Planning*.

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	4Y 2S	7.5	Project Management Laboratory	Instructor	3P
MIEIC	4Y 2S	6	Software Systems Architecture	Instructor	3TP
MIEIC	5Y 1S	6	Inf. Sys. and Software Eng. Seminar	Coordinator	3TP
MIEIC	5Y 2S	6	Dissertation Planning	Coordinator	3TP
—	—	46.5	Total: 8	—	11/term

Table 3.4: Summary table for the school year 2017/2018 at FEUP.

3.1.6 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. 46). 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 3.5: Summary table for school year 2016/2017 at FEUP.

3.1.7 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 3.6: Summary table for school year 2015/2016, at FEUP and FCUP.

3.1.8 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 3.7: Summary table for school year 2014/2015, at FEUP.

3.1.9 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 3.8: Summary table for school year 2013/2014, at FEUP.

3.1.10 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 3.9: Summary table for school year 2012/2013, at FEUP.

3.1.11 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. 46).

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

3.1.12 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 3.11: Summary table for school year 2010/2011, at FEUP and ISEP.

3.1.13 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 3.12: Summary table for school year 2009/2010, at FEUP.

3.1.14 School year 2008/2009

In 2008, after finishing the first year of my Doctoral Programme, I applied for an Invited Assistant Lecturer¹ 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*”.

¹ *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 3.13: Summary table for school year 2008/2009, at FEUP.

3.1.15 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 were 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 3.14: 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 began 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 Prof^a 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. I have been the coordinator since 2017—18.

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). Key-Value 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. I have been the coordinator since 2017—18.

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 (soft-

ware 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.

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, micro-services, 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. I have been the coordinator

since 2017—18.

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, where 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 2013—2018. 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. I've also trained teams for the IEEE Extreme programming competition, which achieved 1st national place in 2017 and 2018.

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

3.5 OTHER PEDAGOGICAL ACTIVITIES

I have participated in 7 editions of *Universidade Júnior*, with 4 different activities, as well as cooperating with *Escola Secundária Filipa de Vilhena* as an *Examiner* for the professional aptitude evaluation of high-school students.

6. **Co-Organizer**, "*Vem programar o teu videojogo de 8 bits!*", 1st edition and 2nd editions. An introduction to game programming using the PICO-8 Fantasy Console, ages 12–15 @ Universidade Júnior. 2018 — 19.
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 to 6th editions. An introduction to visual programming languages using Alice, ages 12–15 @ Universidade Júnior. 2014 — 19.
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

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I participated in 14 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

14. **IREceptor+**, INESC TEC. 2020.
Invited talk "Mutators And Mutations When Evolutionary Strategies Outsmart The Programmer".
13. **OpenDEI**, Faculty of Engineering, University of Porto. 2018.
I was moderator of a panel entitled "Alumni DEI: uma Estratégia para o Futuro", that discussed the existing mechanisms of interaction between DEI (Departamento de Engenharia Informática) and its former students from multiple courses.

12. **Origami Programming**, IEEE CS, Faculty of Engineering, University of Porto. 2018.
Invited talk about functional programming and using Folds as a fundamental building block. The talk was given during an initiative promoted by the IEEE Computer Society University of Porto's Student Branch.
11. **The Peter Fatality: Why People Rise to the Level of their Incompetence**, Commit Porto, Faculty of Engineering, University of Porto. 2015.
I was 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 programme¹ 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 wish to (i) proceed with the project even if they aren't funded, and (ii) wish to

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

keep their intellectual property as a trade secret. Both *Ad-Forecaster* and *Ad-Stress* projects were 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

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 empowers 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. *Senior Architect*. Assessing Software Quality for a financial trading system. Right

before starting my *postdoc*, my company was asked to draft a quality plan for the financial trading system of *Banco Carregosa*. This was a very short project for me, but two main problems were not being tackled at the time: (a) most quality assessments were being done manually, and (b) their tool was mostly a monolith that communicated with external services (usually *exchanges*) via a dedicated message queue. I devised a mock system that would allow simulations to be run against the tool as if it was talking to a real exchange, and which included semantically meaningful grey-box tests (with minimal instrumentation, as *required* by the customer), as well as something akin to what we nowadays call *fuzzing*.

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

2009 — 10. **Senior Architect.** Analysis, architecture, and development of an Information System Porto's City Hall. After our success with the above project (*cf. Locvs*), and waiting for my Ph.D. defense, I was promoted to Senior Architect in ParadigmaXis. Although this new role implied I was more or less involved in almost every project the company was doing, I turned my focus into a second City Hall's necessity: assessing the urban life quality of the city of Porto. Their current tool took the form of an excel-like front-end, that ingested quality data from several sources, and provided a central means for researchers and environmentalists to analyze and synthesize statistical reports. The amount of collected data was relatively low, so it didn't call for *in vogue* solutions such as Apache Hadoop. The problem was two-fold: (a) our company was stuck in an unprofitable "service support" plan, and (b) the City Hall was constantly requiring the implementation of new statistical apparatus, measurements, indicators, and reports. Leading a small team of 3 engineers for this particular project, I started by reimagining their tool as capable of being (re-)configured by the end-user. Working with their researchers, and supported by more generic data interoperability, we devised a new Domain Specific Language (DSL) tailored for their statistical analysis and report creation, while preserving the semantic-oriented infrastructure that boosted their work. We also ensured that their end-user (confined) evolution would be supported by an in-app version control system, allowing them to do simple rollbacks and compare with previous states (both at the data and model level) to pinpoint eventual mistakes.

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

2007 — 10. **Team Leader.** Analysis, architecture, and development of an Information System for Porto's City Hall. The goal of the project was to provide an information system to be used to collect, process, analyse, and store all the textual, graphical, and geospatial heritage information of the city of Porto. The project was adjudicated to the company after a public licitation a few years before, but legal challenges delayed its start considerably. Once it began, a team comprised of a dozen architects, archeologists, and engineers were

waiting for me with a complete overhaul of the initial public specifications. The scope also changed considerably, and we initiated an *analysis* period of drafting UML diagrams for *more than a year* in *bi-weekly meetings*. Feeling this would be a *stillborn* project, leading a team of 4 engineers, I decided to go back to my roots of meta-programming and spawn a crude three-month RAD tool that generated form-like SQLite-backed GUIs by parsing our UML diagrams (exported from Visual Paradigm). Although we were not expecting to have a production-level application, this allowed us to enter something we were hitherto unable to: iterate with tangible artifacts with the customer's end-users (which were *not* amongst the initial stakeholders). We learned two things: (1) that our analysis of the system was missing the operational know-how (*i.e.* the people not in the meetings), and (2) that they domain-model was not (and would hardly ever be) set in stone, as their own processes were evolving. This project ultimately led to my Ph.D. thesis and the Oghma framework, which allowed runtime end-user adaptation using Adaptive Object-Modelling.

2. **GeoXis: Geo-spatial Back-end Framework and Infrastructure** at ParadigmaXis.
2006 — 07. **Team Leader.** Design and implementation of a geospatial software product line infrastructure. After venturing into several geospatial products, ParadigmaXis tasked me to create a generic framework that would unify their current offer of mobile, desktop, and web products. At the time, our main partners included all major Portuguese telecoms, and there were several features spanning from server-side on-the-fly generation of real-time maps², to localisation in mobile phones without GPS using available antenna information. This engine ultimately ended in Garmin-competing car and sports products, and free services offered by the telecoms. The main challenge was the heavy fragmentation of technologies, including programming languages (from c++ to C#), databases (MySQL, PostgreSQL, PostGIS), front-end (HTML with and without Javascript, Windows CE, and MIPS-based SoC's), and data providers. As a leader of 5 engineers, this was a challenging unification endeavour, that included automated data-processing pipelines and cross-platform code reuse. It also became a major learning lesson: despite all the engineering efforts, the time was ripe for this business model to end.
1. **MapAdventure** at ParadigmaXis { <http://www.mapadventure.com.pt> }
2005 — 06. **Team Leader.** Design and implementation of an application and infrastructure using military cartography in mobile devices. Having moved to a *Team Leader* position inside ParadigmaXis, I was tasked with drafting a commercial solution that would allow the monetization of military cartography provided by IGeOE (Army's Geospatial Information Center), mainly targetted at sports and leisure activities in the wild. The business plan assumed that the country would be divided into regions of interest, and each region could be licensed separately. At a time there were several constraints to such product, namely

² Including traffic information; ask me how.

(1) broadband internet access in Portugal was not widespread, (2) most smartphones were just appearing, and although the company was targetting newer generations of Palm Pilots (Tungsten) and Windows Mobile/CE, they were incompatible, (3) mobile data was just appearing with GPRS, and data plans were *extremely* limited, and (4) licensing and piracy were forces against incorporating the complete maps into the final media. My role as *leader* of a team of 4 engineers, was to tackle these problems with state-of-the-art engineering approaches, which included coming up with compression and cryptographic techniques in a multi-platform mobile-first environment in an age where cloud services were yet to become mainstream.

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.

