

Miguel Duarte

FULL-STACK DEVELOPER

Lisbon, Portugal

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Experience

Freelance Full-stack Developer

TOPTAL

San Francisco, USA (Remote)

Jan. 2017 - currently

Chief Technology Officer (CTO)

HOMEMD

Toronto, Canada (Remote)

April. 2017 - currently

- Planning and development of a Electronic Medical Record (EMR) system with telemedicine capabilities.
- Development of the front-end using React/Redux.
- Development of the back-end, including a Swagger RESTful API, using Node.js.
- Integration with the Amazon Web Services infrastructure, including S3, DynamoDB, CloudFront, SNS, CodePipeline, CloudWatch, and Lambda.

Full-stack Developer

KAJA (VIA TOPTAL)

Singapore (Remote)

Jan. 2017 - April. 2017

- Developed an intelligent itinerary planner that takes into account multiple variables, such as the users' preferences, point-of-interest properties (location, rating, category, etc) using machine learning techniques such as spatial clustering and genetic algorithms.
- Developed a recommender system for events based on the users' Facebook liked pages. The system further cross-referenced the Facebook data with Last.fm's API in order to discern musical tastes.
- Added i18n to the product (static and dynamic elements) using Microsoft Azure's Cognitive Services for automatic cached content translation.
- Implemented a customized itinerary viewer with Google Maps. Implemented custom map overlays and integrated with the Directions API with client-side caching.
- Implemented a complete redesign/rebranding of the front-end.

Invited Assistant Professor

UNIVERSIDADE EUROPEIA (LAUREATE INTERNATIONAL UNIVERSITIES)

Lisbon, Portugal

Feb. 2016 - Jul. 2016

- Responsible for the course Computer Architecture (1 semester, 2015/2016)
- Responsible for the course Databases (1 semester, 2015/2016)

Co-founder

OCEAN SWARM LDA

Lisbon, Portugal

Mar. 2016 - Sep. 2016

- High-tech startup developing multirobot systems for marine environments.
- Involved in several H2020 project proposals.

Teaching Assistant

UNIVERSITY INSTITUTE OF LISBON (ISCTE-IUL)

Lisbon, Portugal

2013 - 2016

- Object-oriented Programming (1 semester, 2015/2016)
- Introduction to Programming (1 semester, 2013/2014)

Software Developer

PTWS LDA

Lisbon, Portugal

2009 - 2012

- Software development in PHP, Javascript, HTML and CSS

Education

PhD in Information Science and Technology

UNIVERSITY INSTITUTE OF LISBON (ISCTE-IUL)

Lisbon, Portugal

2012 - 2016

- Classification: Approved with Distinction
- Specialization in Robotics and Artificial Intelligence
- Thesis title: Engineering Evolutionary Control for Real-world Robotic Systems

MSc in Computer Science

UNIVERSITY INSTITUTE OF LISBON (ISCTE-IUL)

Lisbon, Portugal

2010 - 2012

- Grade average: 18/20
- Thesis title: Hierarchical Evolution of Robotic Controllers for Complex Tasks (grade: 20/20)

BSc in Computer Science

UNIVERSITY INSTITUTE OF LISBON (ISCTE-IUL)

Lisbon, Portugal

2007 - 2010

- Grade average: 17/20

Journal Articles

- [J4] **Evolution of Repertoire-based Control for Robots with Complex Locomotor Systems**
M. Duarte, J. Gomes, S. M. Oliveira, and A. L. Christensen
IEEE Transactions on Evolutionary Computation (2017)
- [J3] **Evolution of Collective Behaviors for a Real Swarm of Aquatic Surface Robots**
M. Duarte, V. Costa, J. Gomes, T. Rodrigues, F. Silva, S. M. Oliveira, and A. L. Christensen
PLoS ONE 11.3 (2016) e0151834
- [J2] **Open Issues in Evolutionary Robotics**
F. Silva, M. Duarte, L. Correia, S. M. Oliveira, and A. L. Christensen
Evolutionary Computation 24.2 (2016) pp. 1–32
- [J1] **Evolution of Hybrid Robotic Controllers for Complex Tasks**
M. Duarte, S. M. Oliveira, and A. L. Christensen
Journal of Intelligent and Robotic Systems 78.3 (2015) pp. 463–484

Book Chapters

- [BC1] **Overcoming Limited Onboard Sensing in Swarm Robotics through Local Communication**
T. Rodrigues, M. Duarte, M. Figueiró, V. Costa, S. M. Oliveira, and A. L. Christensen
Transactions on Computational Collective Intelligence XX, 2015

Conference Proceedings

- [C23] **EvoRBC: Evolutionary Repertoire-based Control for Robots with Arbitrary Locomotion Complexity**
M. Duarte, J. Gomes, S. M. Oliveira, and A. L. Christensen
Proceedings of the Genetic and Evolutionary Computation Conference (GECCO), 2016, in press
- [C22] **Unleashing the Potential of Evolutionary Swarm Robotics in the Real World**
M. Duarte, V. Costa, J. Gomes, T. Rodrigues, F. Silva, S. M. Oliveira, and A. L. Christensen
Proceedings of the Genetic and Evolutionary Computation Conference (GECCO), 2016, in press
- [C21] **Hybrid Control for a Real Swarm Robotic System in an Intruder Detection Task**
M. Duarte, J. Gomes, V. Costa, S. M. Oliveira, and A. L. Christensen
Proceedings of the 18th European Conference on the Applications of Evolutionary Computation (EvoStar), Springer International Publishing, 2016
- [C20] **Application of Swarm Robotic Systems to Marine Environmental Monitoring**
M. Duarte, J. Gomes, V. Costa, T. Rodrigues, F. Silva, V. Lobo, M. Marques, S. M. Oliveira, and A. L. Christensen
Proceedings of IEEE/MTS OCEANS, IEEE Press, Piscataway, NJ, 2016, in press
- [C19] **Design and Development of an Inexpensive Aquatic Swarm Robotics System**
V. Costa, M. Duarte, T. Rodrigues, S. M. Oliveira, and A. L. Christensen
Proceedings of IEEE/MTS OCEANS, IEEE Press, Piscataway, NJ, 2016, in press
- [C18] **Cooperative Coevolution of Control for a Real Multirobot System**
J. Gomes, M. Duarte, P. Mariano, and A. L. Christensen
Proceedings of the 14th International Conference on Parallel Problem Solving from Nature (PPSN), 2016, in press, **nominated for best paper award**
- [C17] **Evolving Controllers for Robots with Multimodal Locomotion**
R. Ramos, M. Duarte, S. M. Oliveira, and A. L. Christensen
Proceedings of the 14th International Conference on Simulation of Adaptive Behavior (SAB), 2016, in press
- [C16] **Genome Variations: Effects on the robustness of neuroevolved swarm controllers**
P. Romano, L. Nunes, A. L. Christensen, M. Duarte, and S. M. Oliveira
Proceedings of the Iberian Conference on Robotics (ROBOT), Springer, Berlin, Germany, 2015
- [C15] **Design of Communication and Control for Swarms of Aquatic Surface Drones**
A. L. Christensen, S. M. Oliveira, O. Postolache, M. J. de Oliveira, S. Sargento, P. Santana, L. Nunes, F. Velez, P. Sebastiao, V. Costa, M. Duarte, J. Gomes, T. Rodrigues, and F. Silva
Proceedings of the International Conference on Agents and Artificial Intelligence (ICAART), SCITEPRESS, Lisbon, Portugal, 2015
- [C14] **Beyond Onboard Sensors in Robotic Swarms: Local Collective Sensing through Situated Communication**
T. Rodrigues, M. Duarte, S. M. Oliveira, and A. L. Christensen
Proceedings of the International Conference on Agents and Artificial Intelligence (ICAART), SCITEPRESS, Lisbon, Portugal, 2015
- [C13] **Experimental Characterization of WSNs Applied to Swarms of Aquatic Surface Drones**
F. Velez, A. Nadziejko, A. L. Christensen, S. M. Oliveira, T. Rodrigues, V. Costa, M. Duarte, F. Silva, and J. Gomes
Proceedings of the 10th Conference on Telecommunications (CONFTELE), 2015
- [C12] **Wireless Sensor and Networking Technologies for Swarms of Aquatic Surface Drones**

F. Velez, A. Nadziejko, A. L. Christensen, S. M. Oliveira, T. Rodrigues, V. Costa, M. Duarte, F. Silva, and J. Gomes

Proceedings of the IEEE 82nd Vehicular Technology Conference (VTC Fall), 2015

[C11] **Hybrid Control for Large Swarms of Aquatic Drones**

M. Duarte, S. M. Oliveira, and A. L. Christensen

Proceedings of the International Conference on the Synthesis and Simulation of Living Systems (ALIFE), MIT Press, Cambridge, MA, 2014

[C10] **JBotEvolver: A Versatile Simulation Platform for Evolutionary Robotics**

M. Duarte, F. Silva, T. Rodrigues, S. M. Oliveira, and A. L. Christensen

Proceedings of the International Conference on the Synthesis and Simulation of Living Systems (ALIFE), MIT Press, Cambridge, MA, 2014

[C9] **Evolution of hierarchical controllers for multirobot systems**

M. Duarte, S. M. Oliveira, and A. L. Christensen

Proceedings of the International Conference on the Synthesis and Simulation of Living Systems (ALIFE), MIT Press, Cambridge, MA, 2014

[C8] **The case for engineering the evolution of robot controllers**

F. Silva, M. Duarte, S. M. Oliveira, L. Correia, and A. L. Christensen

Proceedings of the International Conference on the Synthesis and Simulation of Living Systems (ALIFE), MIT Press, Cambridge, MA, 2014

[C7] **What you choose to see is what you get: an experiment with learnt sensory modulation in a robotic foraging task**

T. Rodrigues, M. Duarte, S. M. Oliveira, and A. L. Christensen

Proceedings of the 16th European Conference on the Applications of Evolutionary Computation (EvoStar), Springer, Berlin, Germany, 2014

[C6] **Real-time Control of a Mobile Robot Using Electrooculography**

C. Duque, M. Duarte, M. Ribeiro, S. M. Oliveira, A. L. Christensen, and N. Souto

Proceedings of the 9th Conference on Telecommunications (CONFTELE), 2013

[C5] **Toward Evolved Vision-based Control for a Quadcopter**

P. Szczawinski, M. Duarte, S. M. Oliveira, and A. L. Christensen

Proceedings of the 9th Conference on Telecommunications (CONFTELE), 2013

[C4] **Hierarchical evolution of robotic controllers for complex tasks**

M. Duarte, S. M. Oliveira, and A. L. Christensen

*Proceedings of the IEEE International Conference on Development and Learning and on Epigenetic Robotics (ICDL-EPIROB), IEEE Press, Piscataway, NJ, 2012, **Paper of Excellence Award***

[C3] **Automatic Synthesis of Controllers for Real Robots Based on Preprogrammed Behaviors**

M. Duarte, S. M. Oliveira, and A. L. Christensen

Proceedings of the 12th International Conference on Simulation of Adaptive Behaviour (SAB), Springer, Berlin, Germany, 2012

[C2] **Structured Composition of Evolved Robotic Controllers**

M. Duarte, S. M. Oliveira, and A. L. Christensen

Proceedings of the 5th International Workshop on Evolutionary and Reinforcement Learning for Autonomous Robot Systems, 2012

[C1] **Towards artificial evolution of complex behaviors observed in insect colonies**

M. Duarte, A. L. Christensen, and S. M. Oliveira

Proceedings of the 15th Portuguese Conference on Artificial Intelligence (EPIA), 2011

International Conference Videos

[IV1] **A Sea of Robots**

A. L. Christensen, M. Duarte, V. Costa, T. Rodrigues, J. Gomes, F. Silva, and S. M. Oliveira

*30th Conference on Artificial Intelligence (AAAI-16), Phoenix, Arizona, 2016, **Winner of the Best Robot Video Award and a “Shakey” award**, URL: <https://goo.gl/Qxgi12>*

Theses and Reports

[TR2] **Engineering Evolutionary Control for Real-world Robotic Systems**

M. Duarte

University Institute of Lisbon (ISCTE-IUL), 2016

[TR1] **Hierarchical Evolution of Robotic Controllers for Complex Tasks**

M. Duarte

University Institute of Lisbon (ISCTE-IUL), 2012

Reviewing Activity

- International Symposium on Distributed Autonomous Robotic Systems (DARS), 2016
- Complexity, 2016
- IEEE Transactions on Evolutionary Computation, 2016 - 2017
- 10th International Conference on Swarm Intelligence (ANTS), 2016
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2016
- 7th International Conference on Agents and Artificial Intelligence (ICAART), 2015

- Swarm Intelligence Journal, 2014 - 2015
- Journal of Advanced Robotics Systems, 2014
- 14th Towards Autonomous Robotic Systems (TAROS), 2013

Software and Prototype Development

Robotics platform “Ocean Swarm Zero”

RESEARCHER

Apr. 2014 - Mar. 2016

- Responsible for the development of an aquatic robotics platform for the study of control synthesis techniques for multirobot systems in the scope of the CORATAM and HANCAD projects
- Modeling and physical construction of the robots using digital fabrication techniques
- Development of the onboard control system and the operator’s command and control system
- Development of 16 robotic units: 6 prototypes and 10 functional units
- Publication of the software and hardware as open-source: <http://goo.gl/pjtgh9>

Simulator “JBotEvolver”

PROGRAMMER

2011 - now

- Neuroevolution platform and robotics simulator, used in more than 40 scientific publications
- Responsible for the maintenance documentation and improvements of the software
- Publication of the software as open-source: <https://github.com/BioMachinesLab/jbotevolver>

Distributed computing system “Conillon”

PROGRAMMER

2012 - now

- Java-based distributed computing system
- Responsible for development and maintenance
- Used daily as a tool to support research in the BioMachines Lab since 2012, with over 100 computational nodes (over 400 cores)
- Initially developed by Hélio Silva (2010 - 2011)
- Publication of the software as open-source: <https://github.com/BioMachinesLab/conillon>

Research Projects

Control of Aquatic Drones for Maritime Tasks (CORATAM)

Lisbon, Portugal

ROLE: RESEARCHER

Apr. 2014 - Jul. 2015

- FCT project, 8 researchers
- Reference: EXPL/EEIAUT/0329/2013
- Coordinator: Anders Lyhne Christnesen, ISCTE-IUL/IT

Heterogeneous Ad-hoc Network for the Coordination of Aquatic Drones (HANCAD)

Lisbon, Portugal

ROLE: RESEARCHER

Apr. 2014 - Mar. 2016

- Internal IT project, 15 researchers
- Reference: PEst-OE/EEI/LA0008/2013
- Coordinator: Anders Lyhne Christnesen, ISCTE-IUL/IT

Additional Experience in Training and Education

Organizer and speaker at the workshop “Why Should You Use LaTeX Everyday” (3 editions)

ISCTE-IUL, 2015

Organizer and speaker at Robotics workshops for high school students (3 editions)

ISCTE-IUL, 2015

Teaching assistant in the Summer School “Sustainable Technologies and Transdisciplinary Futures”

Vitruvius Fablab, 2013

Co-rganizer and speaker at the Digital Fabrication workshop “Experimentar a Fabricação Interdisciplinar de Objectos”

Vitruvius Fablab, 2013

Supervisor of the research work of two visiting students during their research internship (6 months)

IT-IUL, 2012

Leader of a small team of developers and responsible for their training

PTWS Lda, 2011

Honors & Awards

Awards

2017	Notable Books and Articles, “Open Issues in Evolutionary Robotics”: goo.gl/bS7aEd	<i>ACM</i>
2017	Best PhD Thesis in Robotics, Sociedade Portuguesa de Robótica	<i>SPR</i>
2016	Innovation Award (Honorable Mention), Prémios Exame Informática	<i>Exame Informática</i>
2016	Best Paper Award Nominee, “Cooperative Coevolution of Control for a Real Multirobot System”	<i>PPSN</i>
2012	Paper of Excellence Award, “Hierarchical evolution of robotic controllers for complex tasks”	<i>IEEE ICDL-EPIROB</i>
2012	Merit Scholarship, Top 1 in 500 students in ISCTE-IUL	<i>DGES</i>

2012	Best MSc finalist Award, Caixa Geral de Depósitos (CGD) award	ISCTE-IUL
2011	Academic Excellence Award, top 3% students	ISCTE-IUL
2010	Best BSc finalist Award, Caixa Geral de Depósitos (CGD) award	ISCTE-IUL
2009	Academic Excellence Award, top 3% students	ISCTE-IUL
2008	Academic Excellence Award, top 3% students	ISCTE-IUL

Competitions

2016	1st Place (out of 70), Fraunhofer Portugal Challenge	Fraunhofer AICOS
2016	Best Robot Video, "A Sea of Robots", AAAI Video Competition	AAAI
2014	Finalist, ESEGUR Open Mind Award	ESEGUR
2014	5th Place (out of ~100), "Babel Talk" project, Sapo Codebits VII	SAPO/PT
2013	7th Place (out of 24), "Robô Bombeiro" Robotics Competition	IP Guarda
2012	4th Place (out of ~100), "Floppy Guitar" project, Sapo Codebits VI	SAPO/PT
2011	1st Place, "Weekend Planner" project, Passatempo API Sapo Mapas	SAPO/PT
2011	1st Place, "Radial Colors" project, Windows Phone App Code Camp	Microsoft
2010	6th Place (out of ~100), "Expert Guitar for Noobs", Sapo Codebits IV	SAPO/PT

Invited Talks

2015	Artificial Intelligence and Bricolage, InterD Workshop	Lisbon, Portugal
2015	Security at Sea with Swarms of Aquatic Drones, ESEGUR Open Mind Award	Lisbon, Portugal
2014	Design of Communication and Control for Swarms of Aquatic Drones, Breaking the Surface	Biograd na Moru, Croatia
2014	Cryptocurrency for Dummies, Sapo Codebits VII	Lisbon, Portugal
2012	Evolution and Robots - How to Create Artificial Brains for Machines, Sapo Codebits VI	Lisbon, Portugal

Additional Information

Organization Experience (selected events)

2015	Co-organizer, Forum of ISCTE-IUL School of Technology and Architecture	Lisbon, Portugal
2014	Volunteer, 9th IEEE International Symposium on Medical Measurement and Applications (MeMeA)	Lisbon, Portugal
2014	Co-organizer, Forum of ISCTE-IUL School of Technology and Architecture	Lisbon, Portugal
2014	Volunteer, 21st International Conference on Telecommunications (ICT)	Lisbon, Portugal
2013	Co-organizer, Google DevFest	Lisbon, Portugal
2013	Co-organizer, Nodecopter LX hackathon	Lisbon, Portugal
2011	Co-organizer, Forum of ISCTE-IUL School of Technology and Architecture	Lisbon, Portugal

Affiliations & Positions Held

Instituto de Telecomunicações Lisbon, Portugal
 RESEARCHER 2011 - 2016

- Member of the BioMachines Lab
- Researcher, 2011 - 2012
- Doctoral researcher, 2012 - 2016
- Post-doctoral researcher, Jun 2016 - Dec 2016

IEEE Lisbon, Portugal
 FOUNDING MEMBER OF ISCTE-IUL'S IEEE STUDENT BRANCH 2012 - 2016

- Programme Committee Chair (2012-2013)
- Organized multiple technological events, such as workshops, invited talks, and competitions
- Attended the IEEE Iberian Student Branch Congress, FEUP, Porto, Portugal (2013)
- Attended the IEEE R8 Students and Young Professionals Congress, AGH-UST, Kraków, Poland (2014)

University Institute of Lisbon (ISCTE-IUL) Lisbon, Portugal
 MEMBER OF THE PEDAGOGICAL COMMITTEE 2013 - 2015

Google Developers Group Lisbon, Portugal
 FOUNDING MEMBER 2012 - 2013

- Co-founder, co-organizer and member of the Google Developers Group Portugal
- Co-organizer of the first Google DevFest Portugal, ISCTE-IUL, Lisbon, Portugal

Courses

ROS in a Single Week

Barcelona, Spain

THE CONSTRUCT

Jul. 2016

- Basic ROS, Topics, Services, Actions, Debugging Tools, Final Project

Act by COTEC - COHITEC

Lisbon, Portugal

COTEC

Feb. 2015 - Jul. 2015

- Technology commercialization accelerator. Development of a business proposal. 100 hours of sessions on topics including intellectual property rights, business models, financials, funding, go-to-market strategies, and market analysis

Computational Investing, Part I

Online Course

COURSERA

Sept. 2013 - Nov. 2013

- Company valuation, the Capital Assets Pricing Model, Efficient Markets Hypothesis, the role of information in pricing, historical data and its manipulation, portfolio performance assessment and optimization.
- Final grade: 100.0%, with Distinction

Press Coverage

2016	“Fraunhofer Portugal Challenge distingue trabalhos na área do mar e da saúde”, online article, http://goo.gl/qEzN08	<i>JPN</i>
2016	“AAAI Video Highlights: Drones Navigating Forests and Robot Boat Swarms”, online article, http://goo.gl/0a19qc	<i>IEEE Spectrum</i>
2016	“Drones of the sea learn to swarm”, online article, http://goo.gl/BspG4W	<i>ZDNET</i>
2016	“Will SWARMS of smart surveillance ships soon spy from the sea? Researchers reveal self learning ships that can ‘think for themselves’”, online article, http://goo.gl/T1h9bM	<i>Daily Mail</i>
2015	“Sucesso.pt da Cohitec”, Sic Noticias, national TV segment, http://goo.gl/shqD8r (0:10 - 15:15)	<i>Sucesso.pt</i>
2015	“Exame Informática 467”, Sic Noticias, national TV segment, http://goo.gl/m0DSYi (0:20 - 2:40)	<i>Exame Informática TV</i>
2015	“Mini Fórum CYTED”, RTP Açores, regional TV segment, http://goo.gl/qmJ1p7 (13:00 - 16:00)	<i>Telejornal Açores</i>
2015	“Utilização de drones”, RTP Açores, regional TV segment, http://goo.gl/RhtdM9 (3:30 - 5:00)	<i>Telejornal Açores</i>
2015	“Heróis do Mar e do Enxame”, national print article, http://goo.gl/chQXAY	<i>Exame Informática</i>
2015	“Cohitec: detetar um enfarte numa hora e o HIV em três dias”, online article, http://goo.gl/Cg3c48	<i>Exame Informática</i>
2015	“Inovações que detetam o HIV em três dias e drones que procuram peixe sozinhos. Em português”, online article, http://goo.gl/E95prh	<i>Observador</i>
2015	“Investigadores desenvolvem drone para realizar tarefas no mar”, regional print article, http://goo.gl/RCAL5K	<i>Açoreano Oriental</i>
2015	“Drones no ISCTE-IUL”, national print article, http://goo.gl/296t9p	<i>Fórum Estudante</i>

Certifications

2014	Basic Life Support, Portuguese Red Cross
2010	IELTS 8.0/9.0, British Council
2010	PHP5 ZCE: Zend Certified Engineer, Zend