

# Mahdi Khoramshahi

## Curriculum Vitae

ISIR, Sorbonne Université  
Paris, France

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Ext. links: [Google Scholar](#), [ResearchGate](#)

## Education

- Sept. 2014 – Feb. 2019 **PhD in Robotics and Intelligent Systems**, *École Polytechnique Fédérale de Lausanne, Institute of Microengineering*, Lausanne, Switzerland.  
PhD thesis: From human-intention recognition to compliant-motion control using dynamical systems in physical human-robot interaction. Supervisor: Prof. Aude Billard, Defended on Feb. 15th, 2019
- Sept. 2009 – Nov. 2012 **M.S. in Electrical Engineering (Control Systems)**, *University of Tehran, Department of Electrical and Computer Engineering*, Tehran, Iran.  
Master thesis: A Study on effects of flexible Spine on stability and energy consumption of a quadruped robot. Supervisor: Prof. Majid Nili Ahmadabadi
- Sept. 2004 – Sept. 2009 **B.S. in Electrical Engineering (Control Systems)**, *Sharif University of Technology, Department of Electrical Engineering*, Tehran, Iran.

## Academic Positions & Employment History

- May. 2020 – Oct. 2021 **Post-doctoral Researcher**, *Institute of Intelligent Systems and Robotics (ISIR), Sorbonne Université*, Paris, France, Supervisors: Prof. Nathanael Jarrassé and Prof. Guillaume Morel).
- Feb. 2019 – Mar. 2020 **Post-doctoral Researcher**, *Learning Algorithms and Systems Laboratory, École Polytechnique Fédérale de Lausanne, Institute of Microengineering*, Lausanne, Switzerland, Supervisor: Prof. Aude Billard.
- Apr. 2014 – Sept. 2014 **Internship in Robotics**, *École Polytechnique Fédérale de Lausanne, Institute of Microengineering*, Lausanne, Switzerland, Supervisor: Prof. Aude Billard.
- Sept. 2013 – Apr. 2014 **Research Assistant**, *Cognitive Robotics Laboratory, University of Tehran*, Tehran, Iran, Supervisor: Prof. Majid Nili Ahmadabadi.
- Nov. 2012 – May. 2013 **Internship in Robotics**, *NanoRobotics Laboratory, Carnegie Mellon University*, Pittsburg, USA, Supervisor: Prof. Metin Sitti.
- Oct. 2011 – Nov. 2012 **Internship in Robotics**, *Biorobotics Laboratory (BioRob), École Polytechnique Fédérale de Lausanne (EPFL)*, Switzerland, Supervisor: Prof. Auke Ijspeert.

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## Awards

- May. 2019 – **Early Post-doc Mobility fellowship**, *The Swiss National Science Foundation*  
Nov. 2020 (*SNSF*).
- Nov. 2018 **Nomination for EPFL PhD thesis distinction**, *EPFL EDRS program (Robotics, Control and Intelligent Systems)*.
- Nov. 2018 **PhD thesis nomination for Prix de Lausanne**, *EPFL*.
- Dec. 2017 **Étoiles de l'Europe (Open Science)**, *French Ministry of Higher Education and Research*, Awarded for the AlterEgo project (European project FP7-ICT-600610).

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## Projects and Research Experience

- May 2020 – **Early post-doc mobility**, *Intent-aware control for physically-interactive robotic prosthetic arms through understanding human kinematics in goal-oriented tasks*, ISIR, France, Supervisors: Prof. Nathanael Jarrassé and Prof. Guillaume Morel.  
Nov. 2021 Researcher (Individual fellowship grant awarded by Swiss National Science Foundation)
- Mar. 2019 – **Samsung research project**, *Tactile-based robotic grasping and manipulation*, EPFL,  
Dec. 2020 Switzerland, Supervisor: Prof. Aude Billard.  
Team leader (Funded by Samsung R&D, Korea)
- Aug. 2017 – **SecondHands**, *Designing robotic systems that can offer help to a maintenance technician in a pro-active manner*, EPFL, Switzerland, Supervisor: Prof. Aude Billard.  
Mar. 2020 Researcher (European project H2020-ICT-2014-1)
- Nov. 2016 – **Cogimon**, *Compliant control in humans and humanoids*, EPFL, Switzerland, Super-  
Jul. 2017 visor: Prof. Aude Billard.  
Researcher (European project H2020-ICT-644727)
- Apr. 2014 – **AlterEgo**, *Designing new human-artificial agent interactions through the concept of similarity in order to enhance human social competence*, EPFL, Switzerland,  
Oct. 2016 Supervisor: Prof. Aude Billard.  
Researcher (European project FP7-ICT-600610)
- Sept. 2013 – **Design of energy efficient walking systems**, *Exploitation and modification of natural dynamics through design and control for reaching energy efficient systems*,  
Apr. 2014 Cognitive Robotics Laboratory, University of Tehran, Supervisor: Prof. Majid Nili Ahmadabadi.  
Research assistant (Funded by University of Tehran)
- Nov. 2012 – **Multi-terrain locomotion of water-running robots**, *Closed-loop control of a quadruped water-runner robot*, NanoRobotics Laboratory, Carnegie Mellon University,  
Apr. 2013 Supervisors: Prof. Metin Sitti.  
Visiting Scholar (Personal Funding)

- Aug. 2011 – **Bobcat: a quadruped robot with flexible spine**, *Design and control implementation of a quadruped robot with flexible spine*, Biorobotics Laboratory (BioRob), École Polytechnique Fédérale de Lausanne (EPFL), Supervisors: Prof. Auke Ijspeert, Dr. Alexander Sprowitz.  
Oct. 2012 Internship (Funded by EPFL)

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## Contributions To The Scientific Community

- Sep. 2019 – **Associate Editor**, *Robotics and Automation Letters*, Area of autonomy for mobility and manipulation.  
Present  
2019 **Associate Editor**, *IEEE-RAS International Conference on Humanoid Robots*.  
2015 – **Reviewer**, *Actively providing reviews for IEEE conferences and journals*.  
Present AIM 2015, IROS 2015, AIM 2016, IROS 2018, ICRA 2019, RSS 2019, RO-MAN 2019, IROS 2019, ICRA 2020, IROS 2020, IEEE-TRO, IEEE-RAL.

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## Supervision Experience

- Spring 2019 **Learning ergonomic human-robot interaction**, *Antoine Laurens*, Semester project, MT section, EPFL, Supervisors: Baptiste Busch, Mahdi Khoramshahi, Aude Billard, Wulfram Gerstner.
- **Classification of human vs. hard contacts through force sensing**, *Hédi Fendri*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Aude Billard.
  - **Human robot impedance matching towards unexpected external forces**, *Michael Hodara*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Aude Billard.
  - **Learning the unmodeled dynamics of the task for implicit force control**, *Maxime Bonnesoeur*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Walid Amanhoud, Aude Billard.
- Spring 2018 **Human-intention recognition in ambiguous hand-overs**, *Camilla Carta*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Aude Billard.
- Fall 2017 **Adaptive human-robot interaction: from human intention to motion adaptation using parameterized dynamical systems**, *Antoine Laurens*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Aude Billard.
- Spring 2017 **Learning from sub-optimal demonstrations: the role of compliance in the exploration-exploitation trade-off**, *Louis Faury*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Andrew Sutcliffe, Aude Billard.
- **Intention recognition under uncertainties for human-robot interaction**, *Nicolas Talbot*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Laura Cohen, Aude Billard.

- **Task-adaptation for assistive robotics using switching dynamical systems**, *Thomas Triquet*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Aude Billard.
- **Learning coupled dynamical systems for adaptive robots coordination**, *Zeid Karim*, Semester project, MT section, EPFL, Supervisors: Mahdi Khoramshahi, Aude Billard.

## Teaching Experience

- 2015–2017 Robotic Practicals, EPFL, Lausanne (180 hours in total)
- 2011 Distributed Artificial Intelligence, University of Tehran, Iran (32 hours in total)
- 2010 Machine learning, University of Tehran, Iran (32 hours in total)
  - Robotics, University of Tehran, Iran (32 hours in total)

## Skills and Qualifications

- Automation control** Expert with several years of experience in designing controllers and algorithms with application in robotics including linear, nonlinear, adaptive, optimal control methods, and stochastic and dynamical systems.
- Machine Learning** Experience in Reinforcement Learning (Q-learning, Policy Improvement, etc.), dimension reduction (PCA, LDA, etc.), regression (GMR, SVR, GP, etc. ), clustering (GMM, K-means, etc.), classification (Linear models, SVM, Neural Networks, Nearest Neighbor).
- Signal Processing** Experience with time-series, filtering, and forecasting with applications in robotic and control systems.
- Statistical analysis** Experience with design of experiments, hypothesis testing, and performing statistical analysis using parametric and non-parametric models.
- Programming languages, Operating Systems** C/C++ software development (with focus on control architectures for real-time robotic applications), Matlab and Python (as primary language for scientific computing, machine learning, and control systems design), R/Stata (with focus on statistical inferences), Javascript/CSS/HTML (with beginner knowledge on web/app design) Ubuntu/Linux, Windows.
- Tools** Latex (long experience with scientific typesetting), Microsoft office, Adobe Photoshop and Premiere (intermediate knowledge on image and video editing), Git, SVN.
- Languages** English (proficient), Farsi (Mother tongue), French (B1)