

# Salman Faraji

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## Education

École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland	2018 - now
<b>Post-Doctoral</b> Researcher, Learning Algorithms and Systems laboratory, Prof. Aude billard	
École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland	2013 - 2018
<b>Ph.D.</b> degree in Robotics and Control, Biorob laboratory, Advisor: Prof. Auke Ijspeert	
Dissertation: <a href="#">Towards Robust Bipedal Locomotion: From Simple Models To Full-Body Compliance</a>	
École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland	2011 - 2013
<b>M.Sc.</b> degree in Micro-Engineering, Robotics and Autonomous Systems	
Thesis: <a href="#">A Model-Based Control Approach for Locomotion of Biped Robots</a>	
Supervisor: Prof. Christopher Atkeson (from CMU)	
Sharif University of Technology, Iran	2007 - 2011
<b>B.Sc.</b> degree in Electrical Engineering, Digital Systems and Control	

## Research Interests

Control, Optimization, Dynamics, Robot and Human Locomotion, Learning

## Awards & Honors

- 2017: Nominated for Chorafas PhD Award**, EPFL.
- 2014: Nominated for Best Paper Award**, ICRA conference, Hong Kong.
- 2013: Best Master Project Award**, Commune d'Ecublens, EPFL, Switzerland
- 2011: Best Bachelor Project Award**, Sharif University of Technology, Iran
- 2011: Ranked 1<sup>st</sup>** out of 190, Sharif University of Technology, Iran
- 2007: Member of the National Iranian Elites Foundation**
- 2007: Ranked 3<sup>rd</sup>** out of 400,000, nationwide university entrance exam, Iran

## Professional Experience

- European CogIMon Project, 2018-2019:** Developed collaborative walking controllers
- European Walk-Man Project, 2013-2017:** Developed walking and balancing controllers for humanoids
- Internship at ABB, Summer and Fall 2012:** Developed a thin inspection robot for large gearless mill drives
- Internship at Festo Pneumatics, Summer 2010:** Courses in Pneumatics, Hydraulics, Industrial Sensors, PLC programming
- Robocup small-size soccer league, 2005-2009:** Developed highly agile wheeled robots for soccer

## Languages skills

English (Fluent), German (B1-B2), French (A2), Persian (Native)

## Publications (find full texts and a visual summary [here](#))

### JOURNAL ARTICLES

[S. Faraji](#), H. Razavi and A. Ijspeert. Push recovery with stepping strategy based on time-projection control, in The International Journal of Robotics Research (**IJRR**), vol. 38, num. 5, p. 587-611, 2019.

N. Kashiri, A. Abate, S. J. Abram, A. Albu-Schaffer, P. J. Clary, M. Daley, [S. Faraji](#), R. Furnemont, M. Garabini, H.t Geyer, A. M. Grabowski, J. Hurst, J. Malzahn, G. Mathijssen, D. Remy, W. Roozing, M. Shahbazi, S. N. Simha, J. Song, N. Smit-Anseeuw, S. Stramigioli, B. Vanderborght, Y. Yesilevskiy and N. Tsagarakis, An Overview on Principles for Energy Efficient Robot Locomotion, **Frontiers in Robotics and AI**, vol. 5, p. 2296-9144, 2018.

[S. Faraji](#), A. R. Wu and A. Ijspeert. A simple model of mechanical effects to estimate metabolic cost of human walking, in **Nature Scientific Reports**, 8(1):10998, 2018.

[S. Faraji](#) and A. Ijspeert. 3LP: a linear 3D-walking model including torso and swing dynamics, in The International Journal of Robotics Research (**IJRR**), vol. 36, num. 4, p. 436-455, 2017.

[S. Faraji](#) and A. Ijspeert. Modeling robot geometries like molecules, application to fast multi-contact posture planning for humanoids, in IEEE Robotics and Automation Letters (**RA-L**), vol. 3, num. 1, p. 289-296, 2017.

[S. Faraji](#) and A. Ijspeert. Singularity-tolerant inverse kinematics for bipedal robots: An efficient use of computational power to reduce energy consumption, in IEEE Robotics and Automation Letters (**RA-L**), vol. 2, num. 2, p. 1132-1139, 2017.

[S. Faraji](#) and M. S. Tavazoei. The effect of fractionality nature in differences between computer simulation and experimental results of a chaotic circuit, in Central European Journal Of Physics (**CEJP**), vol. 11, num. 6, p. 836-844, 2013.

S. Haghzad, [S. Faraji](#) and S. Bagheri. Finding Proper Configurations for Modular Robots by Using Genetic Algorithm on Different Terrains, in International Journal of Materials, Mechanics and Manufacturing (**IJMMM**), vol. 1, num. 4, p. 360-365, 2013.

### CONFERENCE ARTICLES

[S. Faraji](#) and A. Ijspeert. Scalable closed-form trajectories for periodic and non-periodic human-like walking, accepted in IEEE International Conference on Robotics and Automation (**ICRA**).

J. Arreguit, [S. Faraji](#) and A. Ijspeert. Fast multi-contact motion planning with a 5-link model and molecule-inspired formulations for humanoids, *Humanoid Robots (Humanoids), 2018 18th IEEE-RAS International Conference on*. IEEE, 2018.

[S. Faraji](#) and A. Ijspeert. Designing a virtual whole body tactile sensor suit for a simulated humanoid robot using inverse dynamics. Intelligent Robots and Systems (**IROS**), Daejeon, South Korea, 2016.

[S. Faraji](#), L. Colasanto and A. Ijspeert. Practical considerations in using inverse dynamics on a humanoid robot: torque tracking, sensor fusion and Cartesian control laws. IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Hamburg, Germany, 2015.

[S. Faraji](#), S. Pouya and A. Ijspeert. Robust and Agile 3D Biped Walking With Steering Capability Using a Footstep Predictive Approach. Robotics Science and Systems (**RSS**), Berkeley, CA, USA, 2014.

[S. Faraji](#), S. Pouya, C. G. Atkeson and A. J. Ijspeert. Versatile and robust 3D walking with a simulated humanoid robot (Atlas): A model predictive control approach. 2014 IEEE International Conference on Robotics and Automation (**ICRA**), Hong Kong, China, 2014.

[S. Faraji](#), S. Pouya, R. Moeckel and A. J. Ijspeert. Compliant and adaptive control of a planar monopod hopper in rough terrain. 2013 IEEE International Conference on Robotics and Automation (**ICRA**), Karlsruhe, Germany, 2013.

## ARTICLES IN PROCESS

[S. Faraji](#), P. Müllhaupt and A. Ijspeert. Time-projection control to recover inter-sample disturbances, application to walking control, under review in IEEE Transactions on Robotics (**T-RO**).

A. R. Wu, [S. Faraji](#) and A. Ijspeert. Modeling asymmetries of torso bending in inclined walking over different speeds, in preparation.

## POSTERS

[S. Faraji](#) and A. R. Wu, Walking framework with simplified 3LP model and time-projection control, Dynamic Walking, Pensacola, Florida, USA, 2018.

A. R. Wu and [S. Faraji](#), Effects of trunk lean and ground slope on leg angle symmetry during gait, Dynamic Walking, Pensacola, Florida, USA, 2018.

A. R. Wu, , [S. Faraji](#), A. Ijspeert. Simple combinations of major energy components to predict cost of human walking. IROS workshop, Vancouver, Canada, 2017.

J. P. Arreguit, [S. Faraji](#), A. Ijspeert. Multi-contact motion planning with a five-mass template model and vector-based equations. IROS workshop, Vancouver, Canada, 2017.

[S. Faraji](#) and A. Ijspeert. A singularity-tolerant inverse kinematics including joint position and velocity limitations. Dynamic Walking, Mariehamn, Finland, 2017.

[S. Faraji](#) and A. Ijspeert. A virtual tactile sensing suit for humanoids based on dynamic equations and internal sensors. Dynamic Walking, Holly, Michigan, USA, 2016.

[S. Faraji](#) and A. Ijspeert. Time-Projection control on 3LP, a simple idea to deal with intermittent pushes online. Dynamic Walking, Holly, Michigan, USA, 2016.

[S. Faraji](#) and A. Ijspeert. 3LP: A linear model of locomotion including falling, swing and torso dynamics. Dynamic Walking, Holly, Michigan, USA, 2016.

[S. Faraji](#), S. Pouya and A. Ijspeert. Robust 3D Walking Using Inverse Dynamics And Footstep Planning With Model Predictive Control. 9th Dynamic Walking Conference (DWC 2014), ETH Zurich, Switzerland, 2014.

S. Pouya, [S. Faraji](#), R. Möckel and A. Ijspeert. Dynamics Modeling and Control Architecture for Efficient, Manoeuvrable and Robust Monoped Hopping over Rough Terrain. 8th Dynamic Walking Conference (DWC 2013), Pittsburgh, USA, 2013.

## TALKS

[S. Faraji](#), Model based control approaches for multi-modal locomotion of a humanoid robot, in Automatic Control Laboratory, hosted by Prof. Colin Jones, EPFL, 2014.

[S. Faraji](#), Multi-Modal locomotion, in Movement generation and control group, hosted by Prof. Ludovic Righetti, Max Planck Institute, 2015

[S. Faraji](#), 3LP walking model: a Fresh Breath for optimizations, Workshop on Robust Optimization-Based Control and Planning for Legged Robots, ICRA conference, 2016.

[S. Faraji](#), Walking Control of Bipedal Robots with Heavy Legs Using Foot Stepping Strategy, in Robotic Systems Laboratory, hosted by Prof. Marco Hutter, ETH Zurich, 2018.