Jonathan Spitz, Ph.D.

A creative roboticist, with a passion for solving complex problems.
Skilled researcher helping humanoid robots learn how to move.

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PROFESSIONAL EXPERIENCE

February 2017 – Present

Postdoctoral researcher at Inria – Nancy, France
- Developed whole-body control algorithms for humanoid robots in MATLAB/C++.
- Implemented a machine learning approach to improve the controller's performance within a few trials.
- Worked with a simulated and real iCub humanoid robot, possessing over 50 degrees of freedom.
- Aided the development of a miniature exploration robot, as a secondary project.

June 2016 – December 2016

Algorithm engineer at Cogniteam – Petach Tikva, Israel
- Worked on computer vision algorithms for autonomous navigation.
- Designed a simulation environment to generate artificial data for algorithm testing.
- Implemented structure-from-motion algorithms using stereo and multiple-view approaches.

March 2015 – October 2015

Finalist at BizTEC Entrepreneurship Competition – Haifa, Israel
- Participated in the summer-school and accelerator stages of the competition. One of 12 finalists out of over 80 teams.
- Worked on all areas of the lean canvas to bring a robotic toy to market.
- Robots received coverage at TechCrunch, IEEE Spectrum.

October 2014 – May 2016

Rapid prototyping of walking robots – Haifa, Israel
- Developed 3D-printed walking and wheeled robots including mechanical and electronic components.
- Designed a compliant biped robot based on series-elastic actuators.
- Programmed control loops and Bluetooth communication on Arduino.

August 2012 – June 2013

DARPA Virtual Robotics Challenge – Haifa, Israel
- Created controllers for locomotion of the ATLAS humanoid robot.
- Worked in Ubuntu Linux using ROS-Gazebo and C++/python.
- Completed the dismounted mobility task (mud-pit, hills and debris areas) using robust crawling gaits.
- Created a robust, dynamic approach to enter the car using ATLAS.

April 2009 – December 2009

Undergraduate Project: Robotics Simulation Environment (ROSIE) – Haifa, Israel
- Created a robotics simulation environment for the Robotics 101 course, coded in C++ and OpenGL.
- Features included forward and backward kinematics, path planning and Jacobian calculation.

August 2007 – September 2007

Intern at Guzik Technical Enterprises – Mountain View, CA, USA
- Designed SolidWorks models for a new product, including a rack, a motherboard and several connected boards.
- Worked with the electrical engineering department to select and position connectors for all the project's boards.

EDUCATION

October 2009 – October 2015

Ph.D. in Mechanical Engineering, Direct Ph.D. track for excellent students, GPA: 94/100.
Technion, Faculty of Mechanical Engineering – Haifa, Israel
Research Title: Bio-Inspired Controllers for Dynamic Locomotion
Advisor: Assoc. Prof. Miriam Zacksenhouse
- Developed biologically inspired controllers that generate stable walking gaits for simple and complex biped models.
- Improved robustness ten-fold using minimal environmental feedback.

- Evolved a range of different gaits using multi-objective genetic algorithms.

March 2005 – February 2010

B.Sc. in Mechanical Engineering
Technion, Faculty of Mechanical Engineering – Haifa, Israel

OTHER SKILLS

Software

MATLAB (+10 years), Arduino (+5 years), C++ (+5 years), Python (4 years), ROS (1 year).

Hardware

SolidWorks (+10 years), 3D printing (2 years), Rapid prototyping (2 years).

Languages

Spanish (native), English (near native), Hebrew (near native), German (basic proficiency), French (basic proficiency).

FELLOWSHIPS AND AWARDS

June 2014: Late Prof. Roland Weill Award for excellence in doctoral research.

December 2012: Fine's scholarship for 1st year Ph.D. students.

March 2007: Dean's Excellence Award for outstanding GPA (4th semester).

PATENTS

[1] "Robot, device and a method for a central pattern generator (CPG) based control of a movement of the robot", United States Patent Application 20140031986, January 2014.

LIST OF PUBLICATIONS

Refereed papers in Journals

[1] J. Spitz, R. Yakar, M. Zacksenhouse,"Machine Learning Tools Facilitate Parameter Tuning of Networks of Matsuoka Neurons", in preparation, August 2017.

[2] J. Spitz, A. Evstrachin, M. Zacksenhouse,"Minimal Feedback to a Rhythm Generator Improves the Robustness to Slope Variations of a Compass Biped", Bioinspiration & Biomimetics, August 2015.

[3] J. Spitz, E. Sidorov, M. Zacksenhouse, "Humanoids Can Take Advantage of Crab-Walking Gaits", International Journal of Humanoid Robotics, December 2014.

Refereed papers in Conference Proceedings

[1] J. Spitz, K. Bouyarmane, S. Ivaldi, J.B. Mouret, "Trial-and-Error Learning of Repulsors for Humanoid QP-based Whole-Body Control", submitted to IEEE-RAS Humanoids. 2017.

[2] J. Spitz, Y. Or, M. Zacksenhouse, "Towards a Biologically Inspired Open Loop Controller for Dynamic Biped Locomotion", In Proceedings of the 2011 International Conference on Robotics and Biomimetics.

LIST OF CONFERENCES

Oral Presentations

[1] "Bio-Inspired Controllers for Dynamic Walking: CPG Enhanced with Minimal Feedback", Israeli Conference on Robotics, 2013.

[2] "A Biologically Inspired Controller for Dynamic Bipedal Locomotion", Graduate Students in Control Conference, 2012.

[3] "Towards a Biologically Inspired Open Loop Controller for Dynamic Biped Locomotion", IEEE International Conference on Robotics and Biomimetics, Phuket, Thailand, 2011.

Poster Presentations

[1] "Analytical and numerical tools for limit-cycle evaluation in hybrid dynamical system", Dynamic Walking Conference, ETH Zürich, Switzerland, 2014.

[2] "Bio-Inspired Controllers for Dynamic Locomotion", Dynamic Walking Conference, CMU Pittsburgh, USA, 2013.

[3] "A Biologically Inspired Controller For Dynamic Biped Locomotion", The Eighth Computational Motor Control Workshop at Ben-Gurion University of the Negev, Israel, 2012.

CONTACT INFORMATION FOR REFERENCES

- Jean-Baptiste Mouret, Ph.D. (Research Director at Inria), jean-baptiste.mouret@inria.fr

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