Jonathan Spitz, PhD.

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.
- Implemented learning strategies that 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.

October 2014 - May 2016

Rapid prototyping of walking robots - Haifa, Israel

- Developed 3D printed walking and wheeled robots, including mechanical and electronic components.
- Designed compliant biped robot based on series elastic actuator.
- Programmed control loops and Bluetooth communications on Arduino.
- Robots received coverage at TechCrunch, IEEE Spectrum.

August 2012 - June 2013

DARPA Virtual Robotics Challenge - Haifa, Israel

- Created controllers for locomotion of the ATLAS humanoid robot.
- Worked in Linux environment (Ubuntu) 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.
- Features included forward and backward kinematics, path planning and Jacobian calculation. Coded in C++ and OpenGL.

August 2007 - September 2007

Intern at Guzik Technical Enterprises - Mountain View, CA, USA

- Designed SolidWorks models for new electronic equipment composed of a rack, a motherboard and several connected boards.
- Worked with electrical engineering department to select and position connectors for all the projectâĂŹs boards.

Education

October 2009 - October 2015

Ph.D. in Mechanical Engineering, Direct PhD 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 (+5 years), Arduino (+5 years), C++ (+5 years), Python (4 years), ROS (1 year)

Hardware

SolidWorks (+5 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 1 st year PhD 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, A. Evstrachin, M. Zacksenhouse,"Minimal Feedback to a Rhythm Generator Improves the Robustness to Slope Variations of a Compass Biped", Bioinspiration & Biomimetics, August 2015.
[2] 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 (*- presenter)

[1] 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 Zurich, 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

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