

## IVAR THORSON

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### EDUCATION, RESEARCH, WORK HISTORY

- **2009-2011** - PhD student at Italian Institute of Technology. Thesis: development of novel, patented hypocycloid-based series-elastic compliant actuator and its incorporation in the construction of a prototype planar hopping robot featuring fiber-reinforced polymer materials and a novel low-gain asynchronous dynamical control system.
- **2010** - Internship at the Advanced Telecommunications Research (ATR), Brain Robot Interface Group, Japan. Studied realtime whole-body humanoid motion control and simulation of hydraulic humanoid robot "CBi". Wrote real-time controller framework for a prototype hybrid electric-pneumatic exoskeleton.
- **2005-2008** - Masters student in Mechatronics at Nagoya University. Researcher at RIKEN Biomimetic Control Research Center, Nagoya, Japan. Received full-ride MEXT scholarship with stipend for 3 years. Thesis topics: invention and simulation of novel metric to quantify gait robustness of passive-dynamic walking robots, design and construction of a novel variable stiffness series elastic actuator prototype.
- **2004-2005** - Electrical Engineer at Dot Corporation, a wireless devices startup company working closely with Microsoft Research. Engineering tasks: prototyping, programming, testing and verification, parts procurement for multiple manufacturing runs, and antenna analysis for radiofrequency subcarrier monitoring.
- **2000-2004** - Student of Electrical Engineering at University of Washington. Specialization: Digital Systems, Controls/Robotics. Graduation project: designed and constructed a holonomic robot platform powered by 3-phase AC servomotors, custom 3-phase inverter with an FPGA, and a multiple-cpu control system.

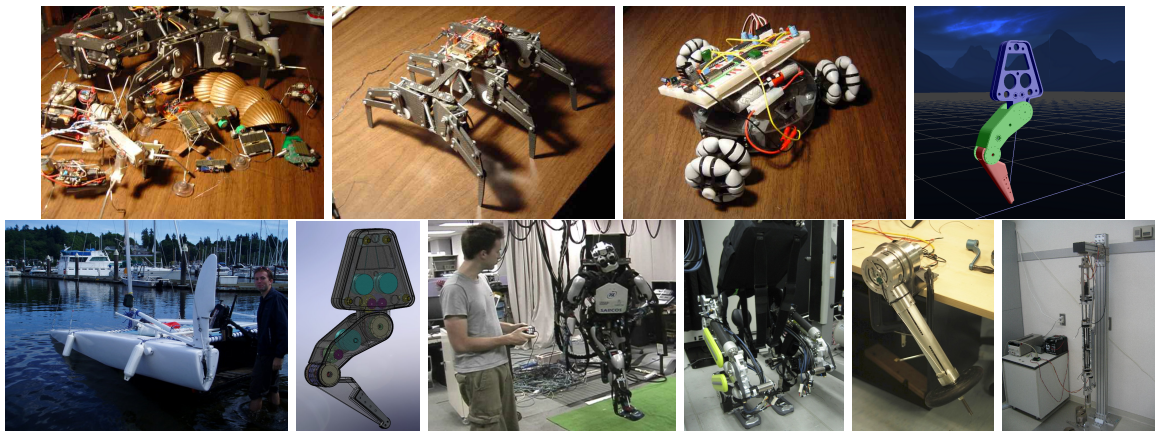
### SELECTED PUBLICATIONS

- Thorson, I. Caldwell, D. "A Nonlinear Series Elastic Actuator for Highly Dynamic Motions", IEEE International Conference on Robotics and Automation, 2011. San Francisco, USA.
- Thorson, I. "On the Gait Robustness of Passive Dynamic Robots, and a Novel Variable Stiffness Series Elastic Actuator" M.S. Thesis, Nagoya University, Feb. 2008.
- Thorson, I. Svinin, M. Hosoe, S. Asano, F. Taji, K. "Quantifying Gait Robustness of Passive Dynamic Robots" 8th SICE System Integration Division Annual Conference, pp.265-266, Hiroshima, Japan, Dec. 2007.
- Thorson, I. Svinin, M. Hosoe, S. Asano, F. Taji, K. "Design Considerations for a Variable Stiffness Series Elastic Actuator in a Robot that Walks and Runs." ROBOMECH 2007. Akita, Japan.

### OTHER SKILLS

- Fluent in Japanese. Certified by Japanese Language Proficiency Test (JLPT) Level 1.
- Robotist with extensive experience designing and building 20+ robots, mostly legged machines.
- Wide Engineering Technologies Experience: Mechanical/Electrical design using Solidworks, ProE, OrCAD, FPGAs, Verilog and other HDLs; authoring real-time robot control software; hacking linux kernel modules; extensive coding in C, C++, Common Lisp, Clojure.

### WORTH A THOUSAND WORDS?



(Clockwise from upper left) Things I built: various robots, carbon fiber hexapod, holonomic platform, rigid body physics simulator, variable stiffness series elastic actuator (SEA), revolute nonlinear SEA, hybrid exoskeleton controller, humanoid robot pose controller, a hopping monopod, and a homebuilt catamaran. Details available at [www.roboloco.net/research](http://www.roboloco.net/research).