

# Ivar Thorson, Ph.D.

✉ | ivar.thorson@gmail.com  
⚡ | ivarthorson.github.io  
☎ | +1.360.440.2508

## OBJECTIVE

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A position in software development, preferably with a focus on machine learning, algorithms, or data science.

## SKILLS AND EXPERIENCE

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### **Whibse, Inc. & LegitScript, Inc.**

DEC 2014 – MAY 2017

*Senior Research Developer*

- Designed and implemented a masterless cluster to harvest and parse Whois, DNS, HTML records for 300M+ websites every 21 days. Used Clojure, Java, and many AWS EC2 Linux (CentOS, Debian) instances.
- Designed and implemented REST API endpoints for custom search-engine backends, fraudulent website detection, cluster job management, spreadsheet analysis, data aggregation, and data visualization.
- Designed and implemented MVC web interfaces for cluster management, internal analyst tools, and prototype client products. Used Javascript, React, Clojurescript, web sockets, Node.js, and HTML5/CSS.
- Designed and implemented workflow for production microservice APIs deployed via Openshift/Kubernetes/Docker. Established mandatory unit tests during builds, and designed integration tests required to deploy production code. Wrote build scripts for Maven, Gradle, Lein, Boot-CLJ, and Jenkins, and Bash shell-script glue.
- Designed and implemented an API for Nutch and ElasticSearch for bulk custom full-text searches of websites.
- Designed a continuously operating data archival system for AWS S3 (up to 1 TB/week)
- Configured, tuned, migrated, and maintained a Cassandra NoSQL cluster for 18 months as it grew from 6 nodes to 24. Reported bugs found to DataStax. Monitored operation with Opscenter and nodetool.
- Used Grafana, Kibana, ElasticSearch, and Logstash for aggregated and individual monitoring of logfiles, events, and activity of thousands of EC2 instances.
- Used Clojure and Python to statistically analyze accumulated data from 7 years of 20 human analysts classifying websites; created plots for reporting purposes and presented findings to stakeholders.
- Used Hadoop and map/reduce algorithms for prototyping, data filtering, and statistical analysis.
- Used JIRA and Trello for developer ticket management.
- Used Git and GitHub for creation and version control of >10 project repositories.
- Used Agile methodologies: kanban, stand-ups, pair programming, business model generation canvases.
- Used Emacs and Eclipse IDEs for development; profiled memory/CPU use on the JVM with JvisualVM
- Used MS Office suite, OpenOffice, and LaTeX to typeset documentation, reports, budget proposals, and presentations for stakeholders (CEO, COO), other developers, and patent attorneys.

**Technologies:** Cassandra, Clojure, Clojurescript, CSS, ElasticSearch, Gradle, HTML, Java, Javascript, Linux (CentOS, Debian), Maven, MySQL, Nutch, Openshift, Python, REST APIs, React, Shell scripts (Bash)

**Reference:** John Horton, CEO. (john.horton@legitscript.com)

### **Oregon Hearing Research Center, Oregon Health & Science University**

SEP 2012 – DEC 2014

*Research Software Developer*

- Designed and implemented a modular functional programming framework in MATLAB to test >780,000 parameterized functional models of cortical neural activity to experimentally obtained data.
- Implemented a GUI browser using MATLAB and Swing to plot and visualize neural model results.
- Configured, compiled custom Linux kernels for a low-cost diskless (netboot) compute cluster.
- Analyzed neural data mathematically and did model comparison with classical and bayesian inference techniques. Used digital filtering (FIR, IIR), wavelet models, and advanced linear algebra techniques.
- Developed novel mathematical models of cortical neural function that resulted in an academic publication.

**Technologies:** C, MATLAB, MySQL, LaTeX, Linux (Ubuntu), Shell scripts (Bash)

**Reference:** Prof. Stephen David. (davids@ohsu.edu)

- Designed and implemented multi-threaded balance control software for a monopod “kangaroo” hopping robot with a carbon fiber exoskeleton in C++ and Clojure.
- Designed and implemented a software network oscilloscope soft real-time plotting system in Clojure.
- Reverse-engineered the network protocol from a Vicon marker-tracking camera system and wrote software to perform sensor fusion on data from the cameras and optical motor encoders.

**Technologies:** C, C++, Clojure, Linux, ProEngineer, Solidworks, Vicon

**Reference:** Prof. Darwin Caldwell. (darwin.caldwell@iit.it)

**Dept of Brain-Machine Interfaces, Advanced Telecommunications Research Center, Japan** JAN – JUN 2010

*Visiting Researcher*

- Debugged legacy hard real-time control code (for Xenomai) written in C.
- Designed and implemented a posture control system for a 51-DOF hydraulic humanoid robot. (C++)
- Implemented a multi-threaded, soft real-time scheduler and custom control software in C++ for a hybrid electric-pneumatic exoskeleton for rehabilitation of elderly and paraplegic patients.
- Wrote a fast monotone cubic spline interpolation library for use with trajectory generation in Clojure.

**Technologies:** C, C++, Clojure, Linux, RTLinux, Shell scripts (Bash), Xenomai

**Reference:** Prof. Sang-Ho Hyon. (sangho@ieee.org)

## EDUCATION

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2009 – 2011 **Ph.D. Advanced Robotics**, *Istituto Italiano di Tecnologia, Italy*

2005 – 2008 **M.S. Mechatronics**, *Nagoya University, Japan*

2000 – 2004 **B.S. Electrical Engineering**, *University of Washington, USA*

## PATENTS

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US 8821338: Elastic Rotary Actuator

ITALY 0001407702: Attuatore Rotante Elastico con Meccanismo Ipocicloida

## LANGUAGES

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ENGLISH Native speaker

JAPANESE Fluent, JLPT Level 1 (highest level)

ITALIAN Intermediate

## REPRESENTATIVE PUBLICATIONS

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THORSON, I. LIENARD, J. DAVID, S. The Essential Complexity of Auditory Receptive Fields. *PLOS Computational Biology*, 2015.

THORSON, I. A Hopping Monopod Robot Incorporating Nonlinear Series Elastic Actuators, Fiber-Reinforced Polymer Construction, and a Concurrent Asynchronous Dataflow-based Centroidal Momentum Balance Controller. *Ph.D. Thesis, Istituto Italiano di Tecnologia*. 2012.

THORSON, I. CALDWELL, D. A Nonlinear Series Elastic Actuator for Highly Dynamic Motions. *IEEE International Conference on Robotics and Automation, San Francisco, USA*. 2011.