DAVID ("DAI") GIRARDO

github.com/daig

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EDUCATION

ASP Graduate Fellow	Massachusetts Institute of Technology	2015 - 2016
Math B.S. w/ Distinction	Worcester Polytechnic Institute	2010 - 2013
CS and Bioinformatics Minors		
Research Apprentice	University of Washington	Spring 2012

WORK EXPERIENCE

Senior Software Engineer (Haskell, Java) @ TripShot — Mar'21 - Present
- Designing and applying routing optimization algorithms

Independent Researcher (Agda) In Collaboration w/ MIRI & MIT — Apr'19 - Feb'21
- Building category-theoretic foundations for machine learning via a type system for dynamical systems.

Software Engineer (Haskell) @ *SimSpace* — Oct'17 - December 2020
- Improving performance, stability, and featureset of Cyber Ranges infrastructure for Financial and Military security exercises/training
- Developed company standard libarary, design patterns, and documentation
- Designed initial implementation of distributed VM health logging system.

Software Engineer (Haskell,JS,Nix) @ *Wrinkl* — Jan'17 - Mar'17
- Designed and built usage analytics database system, integrated with reflex-dom/ghcjs app.

Software Engineer (Haskell,C,Nix) @ *Leapyear Technologies* — Jul'16 - Jan'17
- Implemented improved privacy-preserving machine learning algorithms from literature
- Designed & developed in-memory database for 100gb-scale single-node private queries.
- Collaborated with Tweag.io to deploy private database on Apache Spark using Hadoop HDFS

Haskell Consultant (Part-time) @ *Sodality*
- Collaborated in developing Haskell machine learning DSL compiling to Rust — Mar'17 - Oct'17
- Haskell API integration for financial time-series analysis with Kdb+ — Feb'16 - Jul'16

Technical Staff (Haskell,Scala) @ *MIT Lincoln Laboratory* — Jan'15 - Feb'16
- Project Lead for HSARPA Insider Threat classification
- Network agent modeling / network flow simulation

Computational Biologist (Haskell,R,Julia) @ *Broad Institute of MIT and Harvard* — Mar'14 - Jan'15
- Developed tensor factorization algorithms via Hamiltonian MCMC for high dimensional visualization
- Prototyped distributed algorithms for genome-scale diagnostics
- Results published in Neuron journal

Math Research Intern (Haskell,Python) @ *Center for Discrete Maths and Theoretical CS*	Summer 2013
Compilers Research Assistant (Haskell,OCaml) @ *Worcester Polytechnic Institute*	Oct'12 - Apr'13
Research Intern (Haskell,Python,Perl) @ *Whitney Laboratory for Marine Bioscience*	Summer'11&'12
Comp. Bio. Research Apprentice (Haskell, Python) @ *UW Friday Harbor Labs*	Mar'12 - Jun'12

PEER-REVIEWED PUBLICATIONS

Nature (22/37) "The Ctenophore Genome and the Evolutionary Origins of Neural Systems"

Neuron (2/8) "Role of Tet1/3 Genes and Chromatin Remodeling Genes in Cerebellar Circuit Formation"

ADDITIONAL EXPERIENCE

Algorithmic Inference Through Higher Order Belief Networks
Worcester Polytechnic Institute, Worcester, MA Aug'13 - Dec'13
- Theory and algorithms for Bayesian priors and belief propagation for model uncertainty

Evaluation of Awareness and Preparedness of Tsunami Hazard
Worcester Polytechnic Institute, Worcester, MA Oct'12 - Mar'13
GNS Science, Wellington, NZ
- Designed and conducted a pilot interview study of resident tsunami awareness
- Led the quantitative analysis of the interview data (Haskell)
- Suggested and presented data-informed policy improvements to Wellington Emergency Management Office
- Recognized by WPI president for outstanding research conduct

Physics Applied to Post-stroke Rehabilitation
Worcester Polytechnic Institute, Worcester, MA Dec'10 - Jan'12
- Collaborated with Harvard Biorobotics Lab to develop a soft, actuated orthopedic rehabilitation brace
- Designed physical model and control scheme (Matlab)
- Built robotic arm model with sensor controller of streaming time-series data (Haskell, C++)

OTHER SELECTED PUBLICATIONS AND PRESENTATIONS

"Compositional Design for Scalable Project Architecture", Soft. Eng. Symposium, MIT Lincoln Lab, 2015*
"Type Systems for Differential Privacy", Special Topics Seminar, MIT Lincoln Lab, 2015*
"Rethinking Inheritance with Algebraic Ornaments", Formal Methods Seminar, MIT Lincoln Lab, 2015*
"Tsunami Awareness and Preparedness in the Greater Wellington Region", WPI Library 2013†
"Zero-click, Automatic Assembly, Annotation and Visualization Workflow for Comparative Analysis of Transcriptomes: The quest for novel signalling pathways", *SICB Annual Meeting*, San Francisco CA, 2013*
"A Quest for novel Signaling Molecules in *Pleurobrachia bachei*", University of Washington Library, 2012†
"Automatic transcriptome analysis and quest for signaling molecules in basal metazoans", *SICB Annual Meeting*, Charleston SC, 2012*
"Global discovery and validation of signaling molecules in the Ctenophore, *Pleurobrachia bachei*", *SICB Annual Meeting*, Charleston SC, 2012
"Genome Wide Analysis of neurotransmitter Signaling in the Ctenophore, *Pleurobrachia bachei*", *12th Symposium on Invertebrate Neurobiology*, Tihany, Hungary
"Physics applied to post-stroke rehabilitation - Shoulder Soft Robotics Brace", SPS Awards Library 2011†
"Automatic Transcriptome Analysis & Quest for Signaling Molecules in Ctenophore, *Pleurobrachia bachei*", *Sigma Xi Annual Meeting & International Research Conference*, Raleigh, NC 2011*
"Design Considerations for an Active Soft Orthotic System for Shoulder Rehabilitation", *33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Boston, MA 2011*

* Personally Presented

† First Author

AWARDS AND OUTREACH

AI Safety Research Program, 2019-2020
MIRI Summer Fellow, 2019
Long Term Future Fund Grant, 2019
MIT ASP Graduate Fellowship, 2015
WPI President's "Top 5 Interactive-Qualifying-Project Team", 2014
BIO REU travel scholarship, 2012
Whitney Lab REU "Best Research Presentation" travel scholarship, 2011
Sigma Pi Sigma Undergraduate Research Grant, 2011
Worcester Technical High School Advisory Board Member
Splash@WPI founder (Student teaching outreach organization)