

curriculum vitae

Wren Gayle Romano[†]

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EDUCATION

- Dual-Ph.D. Cognitive Science
& Computational Linguistics**, Indiana University **in study**
Thesis *Chiastic λ -calculi and free word order in Japanese*
Advisors Lawrence Moss, Thomas Grano, Sandra Kübler, Chung-chieh Shan
- M.S.E. Computer Science**, Johns Hopkins University **2008**
Project Heterogeneous Typed Unification in Dyna
Advisor Jason Eisner
- Graduate study in Computer Science**, Portland State University **2005–2007**
Advisor Melanie Mitchell
- B.A. Linguistics** with Anthropology focus, Reed College **2003**
Thesis *Performative Differences of Gender on the Prosody of Am. English Speech*
Advisor Matt Pearson

PROFESSIONAL EXPERIENCE

- Doctoral Fellow**, McMaster University **2011**
Topic Embedded Domain Specific Languages in Haskell
Mentor Christopher Anand

Following the *McMaster Workshop on Domain Specific Languages*, I stayed on to advise graduate students on writing domain specific languages in Haskell. The students' projects ranged from an interactive textbook with 3D diagrams for teaching electromagnetism, to using Haskell's type system to statically enforce dimensional analysis in the software for magnetic resonance imaging.
- Research Programmer**, Johns Hopkins University **2008–2009**
Project Joshua
Funding DARPA GALE

[†]Last name changed from Thornton to Romano in 2014.

Architectural and API design for the Joshua machine translation system to improve extensibility, modularity, scalability, and robustness. In addition to work on Joshua itself, I was one of the researchers for Johns Hopkins' participation in DARPA's GALE project for large-scale machine translation. My work on GALE included maintaining the end-to-end translation pipeline and running experiments to tune parameters and configuration of the pipeline.

Free Geek, Portland, Oregon USA

<i>Chair of the Board</i>	2006–2007
<i>Board of Directors</i>	2005–2007
<i>Council Member</i>	2004–2007

Legal and fiscal responsibility for a 501(c)(3) non-profit community organization that recycles used technology to provide computers, education, internet access, and job skills training to those in need in exchange for community service.

In my time on the board, total income increased 57% to \$748,111 (28% of the increase went to net profit), e-waste recycling increased 32% to 550 tons, and in 2007 26% of donated systems and CRTs were put into reuse. I also helped rewrite the bylaws and organized with sister organizations around the country as we transitioned to become a national organization.

<i>Administrator of Systems and Security</i>	2004–2007
<i>Build Instructor</i>	2004–2007

Teaching volunteers how to build computers from parts, install GNU/Linux, and use the commandline. Setting up testing stations for incoming hardware. System administration for a small network of linux servers and a diskless terminal lab.

The Computer Action Team at Portland State University

<i>CLAW-1 (System administrator)</i>	2006–2007
<i>Desk Cat (Tech support volunteer)</i>	2005–2006

System administration for a large complex network running Linux, Solaris, and Windows providing the computing resources for about 3,000 users for the Maseeh College of Engineering and Computer Science at Portland State University.

Work included converting the network from NIS to LDAP, maintaining tools for user account handling, teaching new volunteers basic and advanced Perl, and monitoring labs.

TEACHING EXPERIENCE**Graduate Associate Instructor**, Indiana University*Graduate Courses*B522 Programming Language Foundations **Spring 2015**Q520 Mathematics and Logic for Cognitive Science **Spring 2012***Undergraduate Courses*Q320 Computation in Cognitive and Information Sciences **Spring 2013**Q260 Programming for Cognitive and Information Sciences **Spring 2013**Q101 Introduction to Cognitive Science **Fall 2012****Graduate Instructor**, Indiana University*Undergraduate Courses*Q250 Math and Logic for Cognitive and Information Sciences **Fall 2011****PUBLICATIONS**

J. Carette, P. Narayanan, W. Romano, C.-C. Shan, and R. Zinkov **Building Blocks for Exact and Approximate Inference**. In *NIPS Workshop on Black Box Learning and Inference*, December 2015, Montréal, Canada.

Z. Li et al. **Joshua 2.0: A Toolkit for Parsing-Based Machine Translation with Syntax, Semirings, Discriminative Training, and Other Goodies**. In *Proc. Joint 5th Workshop on Statistical Machine Translation (WMT) and Metrics MATR*, July 2010, Uppsala, Sweden. <http://www.aclweb.org/anthology-new/W/W10/W10-1718.pdf>

A. Irvine, M. Kayser, Z. Li, W. Thornton, and C. Callison-Burch. **Integrating Output from Specialized Modules in Machine Translation: Transliterations in Joshua**. *Prague Bulletin of Mathematical Linguistics*, 93, 2010. pp. 107–116. <http://versita.metapress.com/content/a2551h6k301w13v2/>

Z. Li et al. **Joshua: An Open Source Toolkit for Parsing-based Machine Translation**. In *Proc. 4th Workshop on Statistical Machine Translation (WMT)*, March 2009, Athens, Greece. pp. 135–139. <http://www.aclweb.org/anthology/W/W09/W09-0424.pdf>

Z. Li, C. Callison-Burch, S. Khudanpur, and W. Thornton. **Decoding in Joshua: Open Source Parsing-based Machine Translation**. *Prague Bulletin of Mathematical Linguistics*, 91, January 2009. pp. 47–56. <http://versita.metapress.com/content/773u7260303w7g20/>

W. Thornton. **Typed Unification in Dyna: An Exploration of the Design Space.** Masters Project Report, Johns Hopkins University, 2008. 39 pages.

W. Thornton. **Heterogeneous Strategies for Unification: Variable–Value Ordering and Optimized Structures.** Technical Report, Johns Hopkins University, 2008. 14 pages.

W. Thornton. **Performative Differences of Gender on the Prosody of American English Speech.** Undergraduate Thesis, Reed College, 2003. 59 pages.

PRESENTATIONS

W. Thornton. **Chiastic Lambda-Calculi.** At *Natural Language and Computer Science (NLCS) workshop*, 28 June 2013, New Orleans, Louisiana, USA. http://cl.indiana.edu/~wren/pubs/chiastic_nlcs2013.pdf

W. Thornton. **Probability Smoothing for NLP: A case study for functional programming and little languages.** At *AMMCS minisymposium on Progress and Prospects in Model-Based Scientific Software Development (SS-SSD)*, 27 July 2011, Waterloo, Ontario, Canada. http://cl.indiana.edu/~wren/pubs/smoothing_ammcs2011.pdf

W. Thornton. **Constrained scrambling in CCG: A case study in Japanese.** At *4th NASSLLI, student session*, 26 June 2010, Bloomington, Indiana, USA. http://cl.indiana.edu/~wren/pubs/ccgjp_nasslli2010.pdf

INVITED LECTURES

McMaster Workshop on Domain Specific Languages, McMaster University, 13–15 June 2011. <http://www.cas.mcmaster.ca/~anand/DSL2011.html>

DEPARTMENTAL LECTURES

Indiana University

“Chiastic Lambda-Calculi.” <i>PL Works</i> , 13 March.	2015
“Computational linguists should interact with other computer scientists or: what I did last summer.” <i>CLingDing</i> , 13 February.	2015
“Chiastic Lambda-Calculi.” <i>Logic Seminar</i> , 4 November.	2014
“A very brief introduction to Haskell.” <i>CLingDing</i> , 11 February.	2013
“Extending CCG for freer word order languages.” <i>CL Lunch</i> , 30 March.	2010
“Using Joshua.” <i>CL Lunch</i> , 13 October.	2009

RESEARCH EXPERIENCE

Hakaru (<https://github.com/hakaru-dev/hakaru>)

Graduate Research Assistant, Indiana University **2015–present**

A probabilistic programming language implemented in Haskell. Unlike other PPLs, Hakaru presents inference procedures as source-to-source program transformations. These transformations include conditioning (by disintegration), simplification of integrals (via Maple), expectation, normalization, and sampling.

Built-To-Order BLAS (<http://ecee.colorado.edu/wpmu/btoblas/>)

Graduate Research Assistant, Indiana University **2014**

A compiler for a domain-specific language for linear algebra programs, seeking to automatically generate efficient BLAS-like operators without relying on the BLAS API itself. Prior work focused on low-level optimizations like loop fusion. My work enhances the compiler by adding high-level optimizations based on algebraic equalities.

Posta

Qualifying project for Ph.D. Cognitive Science

Graduate Research Assistant, Indiana University **2010–2011, 2013–2014**

A Haskell library for HMM-based part-of-speech tagging and CCG supertagging. The current standard for parsing and machine translation involves a pipeline of many different systems, which makes it difficult or impossible for the systems to communicate beyond conveying their basic results. A better architecture would allow two-way communication between each of the systems so that higher-level processes could serve as oracles to guide the decisions of lower-level processes. The focus on producing command-line executable programs instead of reusable and robust libraries is partly to blame for the popularity of pipeline models. The goal of Posta is to provide a library which focuses on real-time, on-line, interactive, and any-time algorithms for tagging in order to facilitate the interactive communication we desire in complete parsing and translation systems.

HLTDI L³ (<http://code.google.com/p/hltdi-l3>) **2009–2010**

A constraint-based solver written in Python for parsing, generating, and translating with [Extensible Dependency Grammar \(XDG\)](#). Within the current explosion in the quantity of information and in the means to access it, much of the world has been left behind because the information is not in a language that they understand. The L³ project (“Learning Lots of Languages”) has the long-term goal of developing a system to translate to and from many under-represented languages of the Global South and (less ambitiously) of creating tools to be used in information retrieval and computer-assisted language learning with these languages.

Joshua (<http://joshua-decoder.org>)

Research Programmer, Johns Hopkins University **2008–2009**

A scalable parsing-based statistical machine translation system written in Java whose goal is to create a coherent and configurable end-to-end machine translation system (as opposed to current state-of-the-art systems which connect diverse components with a morass of shell scripts, making it difficult to reproduce experimental results).

Dyna 2 (<https://github.com/nwf/dyna>)

Research project for M.S.E. Computer Science

2008–2009

Weighted-logic programming language for natural language processing and dynamic programming. Major features include strong typing (including non-linear and recursive types), modules for separate proof universes, and priority-based mixed forward-/backward-chaining inference (with memoization and truth maintenance). The first version of Dyna was a proof-of-concept for an untyped, single-module, forward-chaining fragment of the language. The second version is rewritten in Haskell and intends to cover all the major features.

Paperboy WDM (<http://pbwdm.sourceforge.net>)

Google Summer of Code project

2005

XML-based web-development framework targeting novice users and low-end systems. Written in Perl and XSLT.

Paperboy RSS (<http://paperboy.sourceforge.net>)

2005

Commandline XML-based newsfeed aggregator and XSLT engine. Written in C.

FELLOWSHIPS AND AWARDS

Graduate Fellowship

2009–2010

Tuition remission, health insurance, and stipend. (\$30,000)

Scholarship for work on Dyna

2008

Supported in part by the National Science Foundation under grant No. 0347822 to Jason Eisner. (\$16,600)

Google Summer of Code

2005

Project Paperboy WDM, an XML-based web-development framework.

Mentor Bart Massey, Portland State University

Designed, implemented, and documented a complete functional free/open-source project in under eleven weeks. (\$5,000)

MATHEMATICAL TRAINING

Logic and Type Theory

Curry–Howard isomorphism, polymorphism, dependent types, higher-order logics/types, staged computation, modal logic, substructural logic, weighted logics, proof theory, co/recursion theory, data types

Automata and Grammars

Automata theory, tree automata, transducers, finite-state methods, grammar formalisms (Combinatory Categorical Grammar, Tree Adjoining Grammar, synchronous grammars, probabilistic grammars, . . .), parsing algorithms, machine translation algorithms, transition systems, process calculi (π -calculus, CSP, petri nets, . . .)

Variables

Unification, pattern automata, constraint systems, generalized quantifiers, binding structures

Algebra

Category theory, abstract algebra, order theory, domain theory, semirings and (semi)modules, linear algebra

Probability

Measure theory, information theory, Bayesian probability theory, graphical models (hidden Markov models, hierarchical Bayes nets, conditional random fields, . . .)

Machine Learning

Linear classifiers (SVM, perceptron, . . .), genetic algorithms, neural networks (feed-forward, continuous-time recurrent, . . .), game-tree search, state-space search

TECHNICAL SKILLS

Natural Languages

Japanese, Spanish, Classical Latin, Ancient Greek

Programming Languages

Haskell, Coq, Perl, Python, Java, C, C++, UNIX shell (Bourne, Bash), XSLT, Prolog (SICStus, ECLIPSe), Smalltalk (Squeak), Scheme, nesC, Fortran 90

Markup Languages

\LaTeX , BibTeX , XML, SGML, DTD, XHTML, HTML, CSS, RSS

Frameworks and Tools

SRILM, GIZA++, Moses, Xerox Finite-State Tool, Parsec, JavaCC, Yacc, LDAP, Vim, build systems (Cabal, Make, Ant), version control (Darcs, Git, Mercurial, Subversion, CVS)

Operating Systems

Macintosh OS X (10.2–10.10.5), Macintosh Classic (7.0–9.2), Solaris (9–10), GNU/Linux (Debian, Gentoo, Lineo uLinux), Windows XP, TinyOS (2.0)

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