William E. Byrd

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Scientist
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EDUCATION

Doctor of Philosophy in Computer Science, September 2009
Indiana University, Bloomington, IN
Specialty Area: Programming languages, with an emphasis on functional and logic programming.
Committee: Daniel P. Friedman (Advisor), Amr Sabry, Christopher T. Haynes, Lawrence S. Moss.

Bachelor of Science in Computer Science, *cum laude*, May 1999
University of Maryland, Baltimore County, Baltimore, MD

Bachelor of Science in Special Education, *magna cum laude*, December 1994
College of Charleston, Charleston, SC

RESEARCH

RESEARCH INTERESTS

Relational programming, program synthesis, and combining symbolic artificial intelligence with machine learning and neural networks

Computational tools for precision medicine and biology/chemistry

Functional programming, Scheme, Racket, Lisp

EXTRAMURAL FUNDING

3OT2TR003435-01S1 (William E. Byrd, Corresponding PI; Matthew Might, PI) 01/24/2021–01/23/2022
NIH/NCATS $922,253 (total costs)

3OT2TR003435-01 REVISED (William E. Byrd, Corresponding PI; Matthew Might, PI) 01/24/2020–01/23/2022
NIH/NCATS $965,671 (total costs)

Doc Sherlock: An Autonomous Relay Agent for Discovering the "Unknown Knowns" in Precision Medicine The goal of this project is to develop an autonomous reasoning agent capable of performing inference over large biomedical knowledge graphs. Reasoning over these knowledge graphs includes concept and edge normalization, traversing ontologies, weighing and ranking paths, and performing

causal inference. Our autonomous reasoning agent is being developed as part of the NIH NCATS Biomedical Data Translator project, which involves multiple teams in the United States and Europe.

These awards are a continuation of funding we have received since 2017 for work on the NIH NCATS Biomedical Data Translator project. 3OT2TR003435-01 REVISED is an extension to the original 3OT2TR003435-01 award, which provided $965,671 in total costs for the 01/24/2020–01/23/2021 funding period. Due to a UAB hiring freeze in 2020, caused by the COVID-19 pandemic, we were unable to spend approximately $220,000 of the original $965,671 from the 3OT2TR003435-01 award. The 3OT2TR003435-01 REVISED extension allows us to roll-over these funds and combine them with the $922,253 provided by the new 3OT2TR003435-01S1 award for the 01/24/2021–01/23/2022 budget period.

Role: Corresponding PI

PUBLICATIONS

BOOKS

The Reasoned Schemer, Second Edition. Daniel P. Friedman, William E. Byrd, Oleg Kiselyov, and Jason Hemann. Foreword by Guy Lewis Steele Jr. and Gerald Jay Sussman. Afterword by Robert A. Kowalski. The MIT Press, Cambridge, MA, March 2018. The second edition includes a greatly simplified logic language, a new implementation of the language, a new forward, afterword, and preface, and a complete rewrite of many chapters.
MIT Press web page: `https://mitpress.mit.edu/books/reasoned-schemer-second-edition`
Source code from the second edition: `https://github.com/TheReasonedSchemer2ndEd`

The Reasoned Schemer. Daniel P. Friedman, William E. Byrd, and Oleg Kiselyov. The MIT Press, Cambridge, MA, October 2005. An introduction to relational (pure logic) programming using the miniKanren language. Includes the complete implementation of miniKanren.
MIT Press web page: `https://mitpress.mit.edu/books/reasoned-schemer`
Source code from the first edition: `https://github.com/miniKanren/TheReasonedSchemer`

THESES

Relational Programming in miniKanren: Techniques, Applications, and Implementations.
William E. Byrd. Indiana University, Bloomington, IN, September 30, 2009.
Committee: Daniel P. Friedman (Principal Advisor), Amr Sabry, Christopher T. Haynes, Lawrence S. Moss.
Archival double-spaced version (open access): `https://search.proquest.com/docview/304903505`
Single-spaced version (CC BY 4.0): `https://github.com/webyrd/dissertation-single-spaced`

JOURNALS

Karamarie Fecho, James Balhoff, Chris Bizon, William E. Byrd, Sui Hang, David Koslicki, Stefano E. Rensi, Patrick L. Schmitt, Mathias J. Wawer, Mark Williams, Stanley C. Ahalt. Application of MCAT questions as a testing tool and evaluation metric for knowledge graph–based reasoning systems. In *Clinical and Translational Science*, 2021 Mar 20.
`https://doi.org/10.1111/cts.13021`

William E. Byrd, Michael Ballantyne, Greg Rosenblatt, and Matthew Might. Functional Pearl: A Unified Approach to Solving Seven Programming Problems. In *Proceedings of the ACM on Programming Languages (PACMPL)*, volume 1, ICFP, article 8, September 2017.
Paper (ACM Digital Library, Open Access):
`https://dl.acm.org/citation.cfm?doid=3136534.3110252`
Interactive web version of the paper, courtesy of Nada Amin:
`http://io.livecode.ch/learn/namin/icfp2017-artifact-auas7pp`
Complete code/executable artifact: `https://github.com/gregr/icfp2017-artifact-auas7pp`
Presentation:
`https://podcasts.ox.ac.uk/unified-approach-solving-seven-programming-problems-functional-pearl`

Christina M. Woo, Alejandra Felix, William E. Byrd, Devon K. Zuegel, Mayumi Ishihara, Parastoo Azadi, Anthony T. Iavarone, Sharon J. Pitteri, and Carolyn R. Bertozzi. *Development of IsoTaG, a Chemical Glycoproteomics Technique for Profiling Intact N- and O-Glycopeptides from Whole Cell Proteomes.* Journal of Proteome Research, April 2017, *16*(4), pp 1706–1718.
Paper (ACS Publications):
`https://pubsdc3.acs.org/doi/abs/10.1021/acs.jproteome.6b01053?journalCode=jprobs`
Paper (PubMed Central):
`https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5507588/`

PENDING   William E. Byrd, Daniel P. Friedman, Ramana Kumar, and Joseph P. Near. A Shallow Scheme Embedding of ⊥-Avoiding Streams. To appear in a special issue of *Higher-Order and Symbolic Computation*, in honor of Mitchell Wand's 60th birthday.
Preprint: `http://webyrd.net/frons/frons.pdf`

CONFERENCES

Nada Amin, William E. Byrd, and Tiark Rompf. Lightweight Functional Logic Meta-Programming. In *Proceedings of the 17th Asian Symposium on Programming Languages and Systems (APLAS 2019)*, LNCS vol. 11893, Springer, pp. 225–243, November 2019.
Paper (SpringerLink): `https://link.springer.com/chapter/10.1007/978-3-030-34175-6_12`

Lisa Zhang, Gregory Rosenblatt, Ethan Fetaya, Renjie Liao, William E. Byrd, Matthew Might, Raquel Urtasun, Richard Zemel. Neural Guided Constraint Logic Programming for Program Synthesis. In *Advances in Neural Information Processing Systems 31 (NeurIPS 2018)*, December 2018.
Paper and poster: `https://neurips.cc/Conferences/2018/Schedule?showEvent=11187`
Full proceedings:
`https://papers.nips.cc/book/advances-in-neural-information-processing-systems-31-2018`

Eric Holk, William E. Byrd, Nilesh Mahajan, Jeremiah Willcock, Arun Chauhan, and Andrew Lumsdaine. Declarative Parallel Programming for GPUs. In *Proceedings of the International Conference on Parallel Computing (ParCo)*, Ghent, Belgium, pp. 297–304, March 2011.
Paper (IOS Press): `http://ebooks.iospress.nl/publication/26539`
Preprint:
`https://www.cs.indiana.edu/~achauhan/Publications/Pubs/2011-parco-holk-harlan.pdf`

Joseph P. Near, William E. Byrd, and Daniel P. Friedman. αleanTAP: A Declarative Theorem Prover for First-Order Classical Logic. In *Proceedings of the 2008 International Conference on Logic Programming (ICLP)*, LNCS vol. 5366, Springer-Verlag, Heidelberg, pp. 238–252, December 2008.
Proceedings (SpringerLink): `https://www.springer.com/gp/book/9783540899815`
Preprint: `http://webyrd.net/alphaleantap/alphatap.pdf`
Code (.zip file containing R^6RS-compliant Scheme files, and Prolog files):
`http://webyrd.net/alphaleantap/alphaleanTAP.zip`

Oleg Kiselyov, William E. Byrd, Daniel Friedman, and Chung-chieh Shan. Pure, Declarative, and Constructive Arithmetic Relations (Declarative Pearl). In *Proceedings of the 2008 International Symposium on Functional and Logic Programming (FLOPS)*, LNCS vol. 4989, Springer-Verlag, Heidelberg, pp. 64–80, April 2008.
Proceedings (SpringerLink): `https://www.springer.com/gp/book/9783540789680`
Preprint: `http://webyrd.net/arithm/arithm.pdf`

WORKSHOPS

Nada Amin, William E. Byrd, and Tiark Rompf. Prolog-Style Meta-Programming miniKanren. To appear in *Proceedings of the 2021 Workshop on miniKanren and Relational Programming (miniKanren 2021)*, August 26, 2021. Held online, due to COVID-19.

Bharathi Ramana Joshi and William E. Byrd. metaKanren: Towards a Metacircular Relational Interpreter. To appear in *Proceedings of the 2021 Workshop on miniKanren and Relational Programming (miniKanren 2021)*, August 26, 2021. Held online, due to COVID-19.

William E. Byrd, Gregory Rosenblatt, Michael J. Patton, Thi K. Tran-Nguyen, Marissa Zheng, Apoorv Jain, Michael Ballantyne, Katherine Zhang, Mei-Jan Chen, Jordan Whitlock, Mary E. Crumbley, Jillian Tinglin, Kaiwen He, Yizhou Zhang, Jeremy D. Zucker, Joseph A. Cottam, Nada Amin, John Osborne, Andrew Crouse, and Matthew Might mediKanren: A System for Biomedical Reasoning. In *Proceedings of the 2020 Workshop on miniKanren and Relational Programming (miniKanren 2020)*, Jersey City, NJ, August 27, 2020. Held online, due to COVID-19.

Julie S. Steele and William E. Byrd. dxo: A System for Relational Algebra and Differentiation. In *Proceedings of the 2020 Workshop on miniKanren and Relational Programming (miniKanren 2020)*, Jersey City, NJ, August 27, 2020. Held online, due to COVID-19.

Robert Zinkov, Michael Ballantyne, Gregory L. Rosenblatt and William E. Byrd. Accelerating Program Synthesis in miniKanren. (Lightning talk.) In the Workshop on Trends, Extensions, Applications and Semantics of Logic Programming (TEASE-LP 2020), May 28–19, 2020, Dublin, Ireland. Held online due to COVID-19. Co-located with the European Joint Conference on Theory & Practice of Software (ETAPS 2020).
Lightning Talk: `https://www.coalg.org/tease-lp/2020/accelerating-program-synthesis-in-minikanren/`

Molly Q Feldman, Yiting Wang, William E. Byrd, François Guimbretière, and Erik Andersen. Towards Answering "Am I on the right track?" Automatically Using Program Synthesis. In *Proceedings of the 2019 ACM SIGPLAN Symposium on SPLASH-E (SPLASH-E 2019)*, October 2019.
Paper (ACM Digital Library): `https://dl.acm.org/citation.cfm?id=3361626`

Gregory Rosenblatt, Lisa Zhang, William E. Byrd, and Matthew Might. First-order miniKanren Representation: Great for Tooling and Search. In *Proceedings of the 2019 Workshop on miniKanren and Relational Programming (miniKanren 2019)*, Berlin, Germany, August 2019.
Proceedings: `http://nrs.harvard.edu/urn-3:HUL.InstRepos:41307116`
Code: `https://github.com/gregr/first-order-miniKanren`

Jason Hemann, Dan Friedman, William E. Byrd, and Matthew Might. A Small Embedding of Logic Programming with a Simple Complete Search. In *Proceedings of the Dynamic Languages Symposium 2016 (DLS '16)*, Amsterdam, Netherlands, November 2016.
Paper (ACM Digital Library): `https://dl.acm.org/citation.cfm?id=2989230`

Dakota Fisher, Matthew Hammer, William E. Byrd, and Matthew Might. miniAdapton: A Minimal Implementation of Incremental Computation in Scheme. In *Proceedings of the 2016 Workshop on Scheme and Functional Programming*, Nara, Japan, September 2016.
Paper: `https://arxiv.org/abs/1609.05337`
Code: `https://github.com/fisherdj/miniAdapton`

Steven Lyde, Matthew Might, and William E. Byrd. Control-Flow Analysis of Dynamic Languages via Pointer Analysis. In *Proceedings of the Dynamic Languages Symposium 2015 (DLS '15)*, Pittsburgh, PA, October 2015.
Paper (ACM Digital Library): `https://dl.acm.org/doi/10.1145/2816707.2816712`
Preprint: `http://matt.might.net/papers/lyde2015control.pdf`

William E. Byrd, Eric Holk, and Daniel P. Friedman. miniKanren, Live and Untagged: Quine Generation via Relational Interpreters (Programming Pearl). In *Proceedings of the 2012 Workshop on Scheme and Functional Programming*, Copenhagen, Denmark, September 2012.
Paper (ACM Digital Library): `https://dl.acm.org/doi/10.1145/2661103.2661105`
Preprint: `http://webyrd.net/quines/quines.pdf`
Code: `https://github.com/webyrd/quines`

Claire E. Alvis, Jeremiah J. Willcock, Kyle M. Carter, William E. Byrd, and Daniel P. Friedman. cKanren: miniKanren with Constraints. In *Proceedings of the 2011 Workshop on Scheme and Functional Programming (Scheme '11)*, Portland, OR, October 2011.
Paper: `http://www.schemeworkshop.org/2011/papers/Alvis2011.pdf`
Code (slightly updated): `https://github.com/calvis/cKanren/tree/nov2011`
Code (radically updated): `https://github.com/calvis/cKanren`

Eric Holk, William E. Byrd, Jeremiah Willcock, Torsten Hoefler, Arun Chauhan, and Andrew Lumsdaine. Kanor: A Declarative Language for Explicit Communication. In *Proceedings of the Thirteenth International Symposium on the Practical Aspects of Declarative Languages (PADL)*, Austin, TX, pp. 190–204, January 2011.
Paper (SpringerLink): `https://link.springer.com/chapter/10.1007/978-3-642-18378-2_16`
Preprint: `http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.299.351`

Andrew W. Keep, Michael D. Adams, Lindsey Kuper, William E. Byrd, and Daniel P. Friedman. A Pattern-matcher for miniKanren -or- How to Get into Trouble with CPS Macros.
In *Proceedings of the 2009 Workshop on Scheme and Functional Programming*, Cal Poly Technical Report CPSLO-CSC-09-03, pp. 37–45, August 2009.
Full proceedings: `http://www.schemeworkshop.org/2009/scheme2009.pdf`

William E. Byrd and Daniel P. Friedman. αKanren: A Fresh Name in Nominal Logic Programming. In *Proceedings of the 2007 Workshop on Scheme and Functional Programming*, Université Laval Technical Report DIUL-RT-0701, pp. 79–90, September 2007.
Paper: `http://schemeworkshop.org/2007/procPaper8.pdf`

Authors' revised paper (recommended): `http://webyrd.net/alphamk/alphamk.pdf`
Revised code (R^5RS-compliant Scheme file): `http://webyrd.net/alphamk/alphamk.scm`

William E. Byrd and Daniel P. Friedman. From Variadic Functions to Variadic Relations: A miniKanren Perspective. In *Proceedings of the 2006 Scheme and Functional Programming Workshop*, University of Chicago Technical Report TR-2006-06, pp. 105–117, September 2006.
Proceedings: `http://schemeworkshop.org/2006/scheme2006.pdf`

Alan T. Sherman, Brian O. Roberts, William E. Byrd, Matthew R. Baker, and John Simmons. Developing and Delivering Hands-on Information Assurance Exercises: Experiences with the Cyber Defense Lab at UMBC. In *Proceedings from the Fifth IEEE Systems, Man and Cybernetics Information Assurance Workshop*, West Point, NY, pp. 242–249, June 2004.
Paper (IEEE Digital Library): `https://ieeexplore.ieee.org/document/1437823`

OTHER WRITING

William E. Byrd and Daniel P. Friedman. Towers of Little Languages. (Foreword to *The Joy of Clojure, Second Edition* by Michael Fogus and Chris Houser, Manning, 2014.)
Manning liveBook link to the foreword:
`https://livebook.manning.com/#!/book/the-joy-of-clojure-second-edition/foreword-to-the-second-edition/`
Manning web page for the book:
`https://www.manning.com/books/the-joy-of-clojure-second-edition`

SCHOLARSHIPS

National Institute of General Medical Sciences (NIGMS) Scholarship (January, 2016)
Awarded $2,235 towards tuition for the Cold Spring Harbor Laboratory synthetic biology course I attended in the summer of 2015.

PROGRAMMING TOOLS DESIGNED

mediKanren (under active development, in collaboration with Greg Rosenblatt, Matt Might, Michael Patton, Andy Crouse, other members of the Hugh Kaul Precision Medicine Institute at the University of Alabama at Birmingham, and other collaborators around the world)
Biomedical reasoning system built on miniKanren, with a custom graph database and query language, funded by the NIH NCATS Biomedical Data Translator Project, and used internally at the Hugh Kaul Precision Medicine Institute as part of the research consultation service.
`https://github.com/webyrd/mediKanren`

Barliman (in collaboration with Greg Rosenblatt, with contributions by Michael Ballantyne)
Program editor that can perform synthesis of higher-order, recursive Scheme code.
`https://github.com/webyrd/Barliman`

Shin-Barliman (under active development, in collaboration with Kanae Tsushima, and which will incorporate contributions by Michael Ballantyne, Greg Rosenblatt, and Rob Zinkov)
Next-generation version of Barliman.
`https://github.com/k-tsushima/Shin-Barliman`

PROGRAMMING LANGUAGES DESIGNED

miniKanren (in collaboration with Daniel P. Friedman, Oleg Kiselyov, and Chung-chieh Shan)
A declarative applicative logic programming system.
`http://miniKanren.org/`

mediKanren (language design in collaboration with Greg Rosenblatt and Matt Might)
miniKanren extended with a graph database, for use in the NIH NCATS Biomedical Data Translator
Project.
`https://github.com/webyrd/mediKanren`

cKanren (in collaboration with Claire Alvis, Daniel P. Friedman, Jeremiah Willcock, and Kyle
Carter; derived from miniKanren)
A constraint logic programming framework.
`https://github.com/calvis/cKanren`

αKanren (in collaboration with Daniel P. Friedman; derived from miniKanren, and inspired by
James Cheney and Christian Urban's αProlog)
A nominal logic programming language.
`http://www.cs.indiana.edu/~webyrd/#alphaKanren`

Harlan (in collaboration with Eric Holk, Claire Alvis, Jeremiah Willcock, Nilesh Mahajan, Ryan
Newton, Arun Chauhan, and Andrew Lumsdaine)
An experimental functional programming language for the GPU.
`https://github.com/eholk/harlan`

Kanor (in collaboration with Eric Holk, Jeremiah Willcock, Nilesh Mahajan, Aaron Hsu, Arun
Chauhan, and Andrew Lumsdaine)
A declarative language for explicit communication.

INVITED COURSES

Relational Programming in miniKanren: an Interactive Tutorial (arranged by Haochen Xie and
Sicss Society; hosted by Atsushi Igarashi) Kyoto, Japan, May 15–16, 2018.
Taught a two-day interactive mini-course on miniKanren and relational programming at the University of Kyoto.
Topics included: introduction to relational programming, translating functions to relations, relational interpreters in miniKanren, program synthesis via relational interpreter, and implementing
microKanren.

Summer School on Relational Programming (sponsored by JetBrains; hosted by Dmitri Boulytchev)
St. Petersburg, Russia, August 24–28, 2015.
Taught a one-week, 40-hour course on relational programming in miniKanren to 13 students from
universities in St. Petersburg and from JetBrains.
Topics included: introduction to Scheme and Racket, introduction to relational programming, translating functions to relations, environment-passing interpreters in Scheme, relational interpreters in
miniKanren, and implementing logic programming and constraint logic programming systems.

INVITED TALKS

Relational Programming in miniKanren (hosted by Nada Amin)
Guest lecturer, CS 252R (Programming Languages Studio), Harvard University, Cambridge, MA, September 7 & 9, 2021.

Relational Programming in miniKanren (hosted by Nada Amin)
Guest lecturer, CS 152 (Programming Languages), Harvard University, Cambridge, MA, April 13, 2021.

Relational Programming in miniKanren: Program Synthesis, Treating Rare Diseases, and More! (hosted by Harley Eades III)
Computer Science Colloquium, Augusta University, Augusta, GA, February 12, 2021. Held online due to COVID-19.

Relational Programming in miniKanren
NUS Hackers, National University of Singapore, February 5, 2021. Held online.

Semantics-based Synthesis in miniKanren (keynote)
The 23rd International Symposium on Practical Aspects of Declarative Languages (PADL) 2021, January 18, 2021. Held online due to COVID-19. Co-located with the ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2021). `https://popl21.sigplan.org/home/PADL-2021#program`

mediKanren: Relational and Functional Programming for Precision Medicine (hosted by Pjotr Prins)
University of Tennessee Health Science Center, Memphis, TN, February 28, 2020.

Relational Programming, Program Synthesis, and Biology (hosted by Matthew Lakin)
Computer Science Colloquium Series, University of New Mexico, Albuquerque, NM, October 23, 2019.

Lessons from Building an Interactive Biomedical Reasoning System (hosted by Kanae Tsushima)
National Institute of Informatics, Tokyo, Japan, December 18, 2018.

Hygienic Scheme Macros & miniKanren (hosted by Yasuaki Kudo)
Tokyo Haskell Meetup, Tokyo, Japan, December 17, 2018.
`https://www.meetup.com/ja-JP/Tokyo-Haskell-Meetup/?_cookie-check=6IX88Ng-xGsKO6FK`

Recent Research on miniKanren (hosted by Dmitri Boulytchev)
Boulytchev Lab, St. Petersburg State University, St. Petersburg, Russia, October 15, 2018.

The Next 100,000 Notions of 'Variable'
Leetspeak 2018, Malmö, Sweden, October 13, 2018.
`https://leetspeak.se/2018/speakers.html#speaker-3`

Personal Data Preservation, Inspired by Ancient Writing
Clojure/SYNC 2018, New Orleans, LA, February 15, 2018.
`https://clojuresync.com/will-byrd/`

Implementing a Relational Programming Language in a Functional Language (with Nada Amin)
Cambridge NonDysFunctional Programmers Meetup, Cambridge, UK, January 23, 2018.
`https://www.meetup.com/Cambridge-NonDysFunctional-Programmers/events/246603367/`

Logic Programming, Semantics, and a Bit of Cleverness
Logic and Semantics Seminar, University of Cambridge, Cambridge, UK, January 23, 2018.

Relational Programming and Program Synthesis in miniKanren
University of Oxford, Oxford, UK, January 18, 2018.

miniKanren: a Family of Languages for Relational Programming
Fourteenth International Symposium on Functional and Logic Programming (FLOPS 2018), Nagoya, Japan, May 9, 2018.
`http://www.sqlab.jp/FLOPS2018/`

miniKanren: a Family of Languages for Relational Programming (arranged by Haochen Xie and Sicss Society; hosted by Yasuhiko Minamide)
Tokyo Institute of Technology (Titech), Tokyo, Japan, May 7, 2018.

Lessons from Building an Interactive Biomedical Reasoning System (arranged by Haochen Xie and Sicss Society; hosted by Yoshihiro Imai/DWANGO; translation by Youyou Cong)
Public Sicss Society Event, DWANGO Building, Tokyo, Japan, May 6, 2018.
`https://sicss.connpass.com/event/83801/`

Program Synthesis with miniKanren
Code Mesh 2017, London, England, November 8, 2017.
`http://www.codemesh.io/`

The Reasoned Racketeers (keynote, with Daniel P. Friedman)
RacketCon, Seattle, WA, October 7, 2017.
`http://con.racket-lang.org/`

The Most Beautiful Program Ever Written
Papers We Love, New York, NY, April 12, 2017.
`https://www.meetup.com/papers-we-love/events/238718664/`

Synthesis of Lisp Programs
LispNYC, New York, NY, April 11, 2017.
`https://www.meetup.com/LispNYC/events/236903739/`

Relational Programming
KatsConf 2, Dublin, February 18, 2017.
`http://www.katsconf.com/#nav-speakers`

The Promise of Relational Programming
Partial Evaluation and Semantic-Based Program Manipulation (PEPM 2016), San Diego, CA, January 18, 2016.
`http://conf.researchr.org/event/POPL-2016/pepm-2016-invited-invited-talk-william-byrd`

A Vision for Relational Programming in miniKanren
Code Mesh 2015, London, England, November 4, 2015.
`https://vimeo.com/146117469`

The Promise of Relational Programming (keynote)
PolyConf, Poznań, Poland, July 2, 2015.
`https://www.youtube.com/watch?v=eQL48qYDwp4`

Relational Programming in miniKanren
The Computer Laboratory, University of Cambridge, Cambridge, England, December 6, 2013.
`http://talks.cam.ac.uk/talk/index/49257`

Meta-Programming in Logic Programming (with Nada Amin)
Code Mesh 2013, London, England, December 5, 2013.
`http://codemesh.io/#william-byrd`

Fun with Relational Interpreters in miniKanren (keynote, with Daniel P. Friedman)
flatMap, Oslo, Norway, May 14, 2013.
`http://2013.flatmap.no/danwill.html`

The Unreasonable Schemers (guest of honor, with Daniel P. Friedman)
miniKanren *Conf^o* (associated with Clojure/West), Portland, OR, March 19, 2013.
`http://clojurewest.org/schedule/`

Relational Programming in miniKanren (with Daniel P. Friedman)
Strange Loop, St. Louis, MO, September 24, 2012.
`http://www.infoq.com/presentations/miniKanren`

TALKS

miniKanren: a minimal declarative language for relational programming
FOSDEM 2021, February 7, 2021. Held online due to COVID-19.
`https://fosdem.org/2021/schedule/event/minimalkanren/`

mediKanren: A System for Bio-medical Reasoning (presentation of paper written with Gregory Rosenblatt, Michael J. Patton, Thi K. Tran-Nguyen, Marissa Zheng, Apoorv Jain, Michael Ballantyne, Katherine Zhang, Mei-Jan Chen, Jordan Whitlock, Mary E. Crumbley, Jillian Tinglin, Kaiwen He, Yizhou Zhang, Jeremy D. Zucker, Joseph A. Cottam, Nada Amin, John Osborne, Andrew Crouse, and Matthew Might)
miniKanren and Relational Programming Workshop (miniKanren 2020), August 28, 2020. Co-located with the ACM SIGPLAN International Conference on Functional Programming (ICFP 2020).

CLP(SMT) (talk written with Nada Amin, based on joint work)
Domain Specific Language Design & Implementation (DSLDI 2018), Boston, MA, November 6, 2018. Part of the ACM SIGPLAN conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH 2018).

Functional Pearl: A Unified Approach to Solving Seven Programming Problems (presentation of paper written with Michael Ballantyne, Greg Rosenblatt, and Matthew Might)
ACM SIGPLAN International Conference on Functional Programming (ICFP 2017), Oxford, UK, September 4, 2017.
`https://podcasts.ox.ac.uk/unified-approach-solving-seven-programming-problems-functional-pearl`

Barliman: Trying the Halting Problem Backwards, Blindfolded (with Greg Rosenblatt)
Clojure/conj, Austin, TX, December 3, 2016.
`https://www.youtube.com/watch?v=er_lLvkklsk`

New Tools and Practices for Online Collaboration in Teaching, Learning, and Research of Programming Languages
Off-the-Beaten Track (OBT 2016), St. Petersburg, FL, January 23, 2016. Co-located with the ACM
SIGPLAN Symposium on Principles of Programming Languages (POPL 2016).
`http://conf.researchr.org/getImage/OBT-2016/orig/OBT_2016_paper_14.pdf`

miniKanren, a Language for Relational Programming (CS242 guest lecture)
Stanford University, Stanford, CA, November 30, 2015.

We Need Real Tools for Generating Type Inferencers (talk written with Nada Amin)
Off-the-Beaten Track (OBT 2014), San Diego, CA, January 25, 2014. Co-located with the ACM
SIGPLAN Symposium on Principles of Programming Languages (POPL 2014).

From Greek to Clojure! (with Nada Amin)
Clojure/conj, Alexandria, VA, November 14, 2013.
`https://www.youtube.com/watch?v=7kPMFkNm2dw`

A Relational Exploration of the Chomsky Hierarchy (with Daniel P. Friedman)
Strange Loop, St. Louis, MO, September 18–20, 2013.
`http://www.infoq.com/presentations/chomsky-hierarchy`

miniKanren Philosophy (with Daniel P. Friedman)
Clojure/conj, Raleigh, NC, November 16, 2012.
`http://www.youtube.com/watch?v=fHK-uS-Iedc`

miniKanren, Live and Untagged: Quine Generation via Relational Interpreters (presentation of
paper written with Eric Holk and Daniel P. Friedman)
Scheme and Functional Programming Workshop, Copenhagen, Denmark, September 9, 2012.

Declarative Parallel Programming
Computer Science Department, Colorado State University, Ft. Collins, CO, February 29, 2012.

Generating Quines Using a Relational Interpreter
Indiana University Logic Seminar, Bloomington, IN, February 15, 2012.
`http://www.math.indiana.edu/seminars/event.phtml?id=3355`

miniKanren ("Untalk", with Daniel P. Friedman)
Clojure/conj, Raleigh, NC, November 10, 2011.
`http://blip.tv/clojure/dan-friedman-and-william-byrd-minikanren-5936333`

From Variadic Functions to Variadic Relations: A miniKanren Perspective (presentation of paper
written with Daniel P. Friedman)
Scheme and Functional Programming Workshop, Portland, OR, September 17, 2006.

INVITED TUTORIALS

Interpreting Scheme procedures as logic programs using miniKanren (with Michael Ballantyne)
Scheme and Functional Programming Workshop, Vancouver, Canada, September 4, 2015.
`http://andykeep.com/SchemeWorkshop2015/`

Write a Relational Scheme Interpreter in miniKanren
PolyConf, Poznań, Poland, July 2, 2015.
http://polyconf.com/

Logic Night
Lambda Lounge Utah, Sandy, UT, May 13, 2014.
http://www.meetup.com/Lambda-Lounge-Utah/events/164368252/

miniKanren Tutorial (with Daniel P. Friedman)
Practical Aspects of Declarative Languages (PADL 2014), San Diego, CA, January 23, 2014.
http://www.ist.unomaha.edu/padl2014/#invited

TUTORIALS

One Weird Trick: Relational Interpreters for Program Synthesis (with Gregory Rosenblatt and Daniel P. Friedman)
POPL 2018 TutorialFest, ACM SIGPLAN Symposium on Principles of Programming Languages (POPL), Los Angeles, CA, January 8, 2018.

Program Synthesis Using miniKanren (with Daniel P. Friedman)
Strange Loop, St. Louis, MO, September 17, 2014.
https://thestrangeloop.com/sessions/program-synthesis-using-minikanren

miniKanren Summer School (with Daniel P. Friedman and Jason Hemann)
University of Utah, Salt Lake City, UT, May 27 and 29, 2014.

Program Transformations (with Nada Amin)
Lambda Jam, Chicago, IL, July 9, 2013.
http://lambdajam.com/sessions#amin

ONLINE TUTORIALS (at https://www.youtube.com/user/WilliamEByrd)

miniKanren "uncourse" on Google+ Hangouts
https://www.youtube.com/watch?v=iCuVTGWNU3s&index=1&list=PLO4TbomOdn2cks2n5PvifialL8kQwt0aW

Older miniKanren Hangouts
https://www.youtube.com/watch?v=vRrgaibcTYs&list=PLO4TbomOdn2eGFBHHHZpwo2o82e8Tv6gI

Google+ Functional & Logic Programming Tutorials
https://www.youtube.com/watch?v=2GfFlfToBCo&list=PLO4TbomOdn2dD5HsavVOhlZzZ37o73P3F

INTERVIEWS

Mostly Erlang Episode 050 – miniKanren With William Byrd
Recorded by Zachary Kessin, Thursday, November 13, 2014.
http://mostlyerlang.com/2014/11/26/050-minikanren-with-william-byrd/

Functional Geekery Episode 9 – William E. Byrd
Recorded by Proctor, Monday, April 21, 2014.
http://www.functionalgeekery.com/episode-9-william-e-byrd/

William Byrd on Logic and Relational Programming, miniKanren
Recorded by InfoQ at Code Mesh 2013, London, England, December, 2013.
http://www.infoq.com/interviews/byrd-relational-programming-minikanren

TEACHING

COURSES TAUGHT

Course Instructor, C203, University of Alabama at Birmingham, Spring 2020
Designed all activities, labs, homework, exams, and projects for C203, Introduction to Object-Oriented Programming. Taught all lectures and labs. Taught optional enrichment labs on Emacs and Git. Organized an optional advanced lab section open to any student who wants experience working on more difficult computer science problems.

Course Instructor, A290, Indiana University, Spring 2012
Course designer and inaugural instructor for A290, Tools for Computing: Arduino Development. Asked by the School of Informatics and Computing to design and teach a new 8-week course on physical computing using the Arduino microcontroller, based on previous success integrating Arduino into H211. Taught students how to solder, design and debug circuits, and program Arduino. Challenged students to design and implement their own unique physical computing capstone projects.

Course Instructor, H211, Indiana University, Fall 2010, Fall 2011
Course instructor for H211, Honors Introduction to Computer Science. Redesigned course to incorporate Arduino microcontroller/electronics art projects, 3D modeling, fractals, procedural music generation, and game design and implementation. Incorporated smart materials and Arduino-controlled electronic piano workshops from visiting researcher Catarina Mota. Started popular undergraduate Arduino and 3D Printing clubs at the request of former H211 students.

Associate Instructor, C311 and B521, Indiana University, September 2003–May 2009
http://www.cs.indiana.edu/classes/c311/   http://www.cs.indiana.edu/classes/b521/
Co-taught IU's graduate and undergraduate introductory programming languages courses. Co-wrote *The Reasoned Schemer* (MIT Press, 2005), one of two textbooks used in C311 and B521. Co-designed the miniKanren logic programming language used in both courses. Wrote and delivered lectures on every topic in the course, including: environment-passing, continuation-passing, and store-passing interpreters; continuation-passing style, trampolining, registerization, and other correctness-preserving transformations; hygienic macro expansion; types and type inference; and functional and logic programming paradigms. Nominated for the department's *Associate Instructor of the Year* award.

UNDERGRADUATE PROJECTS SUPERVISED

miniAdapton: A Minimal Implementation of Incremental Computation in Scheme (2016)
Student: Dakota Fisher (co-advised with Matthew Hammer)
We created a minimal version of the Adapton system for incremental computation, and wrote a paper that was accepted to the 2016 Scheme Workshop in Nara, Japan.

Neurosymbolic computation in miniKanren (2014)
Student: Tevyn Bell
(Inspired by Pascal Hitzler's work on combining neural networks and first-order logic.) Tevyn and I implemented a prototype relational simulator for feedforward neural networks.

Weaver: A system for developing interactive fiction based on rules and defeasible logic (2013)
Student: Brittany Ann Moore
(Inspired by previous work with Andrew "Zarf" Plotkin on rule-based interactive fiction.)

"Seg-bot" Arduino-controlled Rideable Segway Clone (2011–2013)
Student: Maria Khokhar
(Inspired by the Seg-bot project: `http://prototyperobotics.com/projects/the-seg-bot`.) Maria and I took a welding class, sourced the parts, welded the steel frame, finished mechanical assembly, and wired the electronics. (Alas, I moved to University of Utah before we were able to complete final assembly and testing.)

Grammar-based Music Generation (summer 2012)
Students: Tevyn Bell, Emilie Mitchell, Brittany Ann Moore
(Inspired by Robert M. Keller's Impro-Visor project: `http://www.cs.hmc.edu/~keller/jazz/improvisor/`.) An experiment in performing research with first-year undergraduates (Tevyn and Emilie). We were able to implement most, but not all, of the grammar-based parsing algorithm used in Impro-Visor. We spent much of our time implementing the languages and machines from Michael Sipser's *Introduction to the Theory of Computation*, in both Scheme and miniKanren. We also discussed and implemented Scheme interpreters, memoization extensions to Scheme, CYK parsing, and grammar-related syntactic abstractions using hygienic macros.

INVITED TALKS

Computer Science and My Life (arranged by Haochen Xie and Sicss Society; hosted and translated by Haochen Xie)
Keynote to open the Nagoya University Programming Seminar & Competition, Nagoya University, Nagoya, Japan, May 13, 2018.

3D Printing, Open Hardware, and the DIY Revolution
CATALYST, Informatics and Computing Student Association, Indiana University, Bloomington, IN, February 18, 2012.

3D Printing, Open Hardware, and the DIY Revolution
Technology Management Club, Kelley School of Business, Indiana University, Bloomington, IN, February 7, 2012.

3D Printing, Open Hardware, and the DIY Revolution
Mechanical Engineering Technology (MET) Department, Purdue University, October 12, 2011. Talk led Purdue's MET Department to create an undergraduate digital fabrication club, and to purchase of five 3D printers and two CNC routers for the club.

TALKS

Concatenative Programming (with Rob Martin)
Lambda Lounge Utah, Sandy, UT, May 12, 2015.

*Animatronic Kittehs, 3D Printers, and Rogue Game Studios –or– Why Computer Science Education
Should be Just-in-Time, not Just-in-Case, and Why (Epic) Failure Should Always be an Option*
Indiana University Programming Languages Group, Bloomington, IN, April 15, 2011.
http://vimeo.com/23254348

INVITED TUTORIALS

Thinking About Recursion (with Nada Amin)
KatsConf 2, Dublin, February 18, 2017.
http://www.katsconf.com/#nav-speakers

Electronic Voodoo Dolls (e-Textiles Tutorial)
ZOOM—Examining the Future of Craft, Indiana University, Bloomington, IN, October 19, 2013.
http://www.iub.edu/~zoom/

TUTORIALS

Concatenative Programming (with Rob Martin)
Code Mesh 2015, London, England, November 2, 2015.
http://www.codemesh.io/codemesh2015/william-e-byrd

RESIDENCIES

Hacker in Residence, Hacker School (now "Recurse Center"), New York City
November 18–22, 2013
https://www.recurse.com/residents#will-byrd
Gave multiple talks and tutorials on relational programming. Worked with students on their projects,
including a relational solver for propositional logic and an artificial intelligence system to play the
real-time strategy game *StarCraft: Brood War*.

OTHER COMPUTING-RELATED EDUCATIONAL ACTIVITIES

The CS Education Zoo
Computer Science education interview series, with co-host Steve Wolfman
http://webyrd.net/zoo.html

Volunteer, Indiana Celebration of Women in Computing (InWIC)
February 5/6, 2010 & February 11, 2012

Organizer, Teen Animatronics Club, July–August, 2010
Boys & Girls Club of Bloomington, IN

Volunteer, Indiana University Tech Week, February, 2010
Boys & Girls Club of Bloomington, IN

Organizer, TeenSIG Programming Club, October 2002–May 2003
Washington Apple Pi Users Group, Rockville, MD

Organizer, Programming Club, Spring 1997
Thurmont Middle School, Thurmont, MD

3D PRINTING DEMOS

Indiana University booth, SuperComputing '12, Salt Lake City, UT, November 10–14, 2012.

Arlington Heights Elementary School Science Night, Bloomington, IN, October 23, 2012.

Minority Engineering Advancement Program (MEAP), IUPUI, Indianapolis, IN, June 22, 2012.

Hoosier Guitar-Building Workshop, Bloomington, IN, May 12, 2012.

Farmer's Market, Bloomington, IN, April 21, 2012.

Pervasive Technology Institute, Indiana University, Bloomington, IN, April 5, 2012.

CATALYST, Informatics and Computing Student Association, Indiana University, Bloomington, IN, February 18, 2012.

Summit Elementary School Science Night, Bloomington, IN, February 10, 2012.

Technology Management Club, Kelley School of Business, Indiana University, Bloomington, IN, February 7, 2012.

Mechanical Engineering Technology (MET) Department, Purdue University, October 12, 2011.

3rd Grade Class, Cumberland Elementary School, West Lafayette, IN, October 12, 2011.

World Maker Faire, New York Hall of Science, Queens, NY, September 17–18, 2011

Bloomington Boys & Girls Club, Bloomington, IN, early 2011.

TEACHING CERTIFICATION

Maryland Educator Certificate (valid 7/1/1995 to 6/30/1998)
Educator ID 4464, Standard Professional I/Generic Special Education 1–8

SERVICE

Member, *Undergraduate Curriculum Committee*, Department of Computer Science, University of Alabama at Birmingham, January 2020–present.

Faculty Co-organizer, *High School Programming Competition 2020*, Department of Computer Science, University of Alabama at Birmingham, January 2020–February 15, 2020 (Competition Date).

STEERING COMMITTEES

miniKanren and Relational Programming Workshop Steering Committee (2020–present).

Scheme and Functional Programming Workshop Steering Committee (September 2015–present).

PROGRAM COMMITTEES

16th International Symposium on Functional and Logic Programming (FLOPS 2022)
May 10-12, 2022, Kyoto, Japan.
`https://conf.researchr.org/home/flops-2022`

ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation (PEPM 2022)
January 17–18, 2022, Philadelphia, PA. Co-located with the ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2022).
`https://popl22.sigplan.org/home/pepm-2022`

Workshop on Trends, Extensions, Applications and Semantics of Logic Programming
(TEASE-LP 2020)
May 28–19, 2020, Dublin, Ireland. Held online due to COVID-19. Co-located with the European Joint Conference on Theory & Practice of Software (ETAPS 2020).

Convivial Computing Salon 2020
March 24, 2020, Porto, Portugal. Co-located with the International Conference on the Art, Science, and Engineering of Programming (<Programming> 2020).

22nd International Symposium on Practical Aspects of Declarative Languages (PADL 2020)
January 20–21, 2020, New Orleans, LA. Co-located with the ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2020).

1st miniKanren and Relational Programming Workshop (miniKanren 2019) (General Chair)
August, 2019, Berlin, Germany. Co-located with the ACM SIGPLAN International Conference on Functional Programming (ICFP 2019).

International Symposium on Principles and Practice of Declarative Programming (PPDP 2019)
October 7–9, 2019, Porto, Portugal. Co-located with the 3rd World Congress on Formal Methods (FM'19)

2018 Scheme and Functional Programming Workshop (Program Chair)
September 28, 2018, St. Louis, MO. Co-located with the ACM SIGPLAN International Conference on Functional Programming (ICFP 2018).

Off the Beaten Track (OBT 2018)
January 13, 2018, Los Angeles, CA. Co-located with the ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2018).

Selection Committee for the ICFP'17 Student Research Competition
September 6, 2017, Oxford, UK. Part of ACM SIGPLAN International Conference on Functional Programming (ICFP 2017).

20th ACM SIGPLAN International Conference on Functional Programming (ICFP 2015)
August 31–September 2, 2015, Vancouver, Canada.

2014 Scheme and Functional Programming Workshop
November 19, 2014, Washington, DC. Co-located with Clojure/conj.

International Workshop on Functional and (Constraint) Logic Programming (WFLP 2014)
September 15–17, 2014, Lutherstadt Wittenberg, Germany.

International Lisp Conference (ILC 2014)
August 14–17, 2014, Université de Montréal, Montréal, Canada.

2013 Scheme and Functional Programming Workshop (Program Chair)
November 13, 2013, Alexandria, VA. Co-located with Clojure/conj.

EXTERNAL REVIEW COMMITTEES

23rd ACM SIGPLAN International Conference on Functional Programming (ICFP 2018)
September 23–29, 2018, St. Louis, MO.

ACADEMIC WORKSHOPS ORGANIZED

1st miniKanren and Relational Programming Workshop (miniKanren 2019) (co-organizer, with Nada Amin)
August, 2019, Berlin, Germany. Co-located with the ACM SIGPLAN International Conference on Functional Programming (ICFP 2019).

2018 Scheme and Functional Programming Workshop (co-organizer, with John Clements)
September 28, 2018, St. Louis, MO. Co-located with the ACM SIGPLAN International Conference on Functional Programming (ICFP 2018).

2013 Scheme and Functional Programming Workshop
November 13, 2013, Alexandria, VA. Co-located with Clojure/conj.
http://webyrd.net/scheme-2013/

CLUBS AND ACTIVITIES FOUNDED

University of Utah

Computer Science Department Weekly Grad Student Night, September 2013–present
Fridays, 6pm–10pm, Large Conference Room, Merrill Engineering Building. As of March 2014, sponsored and funded by the School of Computing.

My friend Andy Keep and I started these new groups at the University of Utah to encourage more interaction between graduate students (and post-docs). Now on its third generation of graduate-student leadership.

Indiana University

Indiana University Arduino Electronics Club, December 2010–November 2014
Fridays, 6pm–midnight, Lindley Hall 008

Indiana University 3D Printing Club, January 2011–November 2014
Sundays, 2pm–10pm, Lindley Hall 008

Created undergraduate Arduino/physical computing and 3D Printing/digital fabrication clubs at the request of former H211 students. Advised students on dozens of electronics and 3D printing projects. Supervised student assembly of three kit 3D printers and a 3D printed "EggBot" plotter. Developed Arduino projects for H211 and A290 courses.

EMPLOYMENT

UNIVERSITY OF ALABAMA AT BIRMINGHAM, Birmingham, AL
Scientist, Hugh Kaul Precision Medicine Institute,
August 2020–present.
https://www.uab.edu/medicine/pmi/
Working with Matt Might, Greg Rosenblatt, and other members of the Hugh Kaul Precision Medicine Institute, along with many other members of the NIH NCATS Biomedical Data Translator Project, on applying computation and automated reasoning to precision medicine, biology, and biochemistry. Also working with colleagues at UAB, along with many other colleagues in the US, Canada, Japan, Russia, and the UK, on improving relational programming, especially in the context of program synthesis.
Assistant Professor, Department of Computer Science & Affiliate faculty, Hugh Kaul Precision Medicine Institute,
August 2019–August 2020
Scientist, Department of Computer Science & Hugh Kaul Precision Medicine Institute,
August 2017–August 2019

UNIVERSITY OF UTAH, Salt Lake City, UT
Research Assistant Professor, U Combinator Research Group,
February 2017–July 2017
http://www.ucombinator.org/
Research Associate, U Combinator Research Group,
October–December 2012 (remote), January 2013–February 2017 (on-site)
http://www.ucombinator.org/
Worked with Matt Might and the members of the U Combinator programming languages research group on relational programming, interpreters, program synthesis, and static analysis.

INDIANA UNIVERSITY, Bloomington, IN
Postdoctoral Researcher, Center for Research in Extreme Scale Technologies (CREST)
(formerly Open Systems Lab), March 2010–December 2012
Worked with Eric Holk, Andrew Lumsdaine, Arun Chauhan, and other members of the NSF-funded Declarative Parallel Programming project on the design, implementation, and assessment of two declarative programming languages for High-Performance Computing: *Kanor*, an embedded Domain-specific Language for message passing; and *Harlan*, a high-level language for general-purpose Graphics Processing Unit (GPGPU) programming. Worked with Nicole Jacquard, Andrew Lumsdaine, Craig Stewart, and Kylie Peppler towards the creation of an IU digital fabrication laboratory (Fab Lab).

Visiting Researcher, August 2009–January 2010
Refined a novel distributed architecture for data privacy in smart rooms. Implemented and benchmarked a prototype system in Scheme, using OpenSSL and a custom version of the *ThreshSig* Java threshold cryptography library.

CAMP GREENTOP, Sabillasville, MD
Director, Summer 2002
Responsible for the safety and well-being of 200 campers and 65 staff at the nation's oldest residential summer camp for children and adults with physical and multiple disabilities. Interviewed and hired staff members, evaluated staff performance, and directly supervised the business manager, unit leaders, activities coordinator and nurses. Coordinated staff training, wrote the staff manual and created the camp web site. Ultimately responsible for all programs, activities, policies and procedures at camp. Previous positions held at Camp Greentop include:
Activities Coordinator, Summer 2000
Assistant Director, Summer 1999
Unit Leader, Summer 1995, Summer 1996
Cabin Leader, Summer 1992, Summer 1993, Summer 1994
Counselor, Summer 1991

THURMONT MIDDLE SCHOOL, Thurmont, MD
Special Education Teacher, August 1995–June 1997
Taught math and English to 7th and 8th grade students with learning disabilities and behavioral disorders. Created extra-curricular clubs for computer programming, chess, and American Sign Language. Co-wrote the Frederick County continuing education curriculum on basic and intermediate computer use in the classroom. Co-wrote Thurmont Middle School's technology grant proposal, resulting in the award of $50,000 for computer and networking hardware. Designed and taught seminars on Internet use for middle school teachers.

AWARDS

Benefitfocus.com "Medal of Honor"
Benefitfocus.com, 2001
Inaugural recipient of Benefitfocus.com's highest award, in recognition of exemplary work in porting the Benefitfocus application to the WebLogic J2EE application server. Award included a $3,000 bonus.

AppNet Excellence Award
AppNet, 2000
Awarded for developing, within a strict deadline, a complex XML Document Type Definition and BladeRunner configuration file that formed the foundation of a major document management system.

Outstanding Senior in Computer Science and Electrical Engineering
University of Maryland, Baltimore County, 1999
One of a handful of seniors to receive this award for "highest academic achievement of graduating seniors majoring in computer science and electrical engineering."

Director's Award for Outstanding Staff Person
Camp Greentop, 1993
Inaugural recipient of Camp Greentop's highest award, given to the staff member who "most epitomizes Camp Greentop and performs above and beyond all reasonable expectations."

PROFESSIONAL PROGRAMMING EXPERIENCE

Lyvegyde.com, Bloomington, IN/Garrett Park, MD
Co-founder and Lead Developer, August 2008–May 2009
Co-designed and developed *lyvegyde*, a guide to live online events. Responsible for site architecture (Ruby on Rails, AJAX, MySQL, nginx web server, Mongrel application server, Ubuntu Linux), middleware and backend development, page caching and other optimizations, and site deployment (using the Capistrano deployment tool).

Benefitfocus.com, Charleston, SC
Software Engineer, February 2001–June 2002
Collaborated with other software engineers to port a multi-million dollar online benefits enrollment application from the Enhydra Java application server to BEA's WebLogic Java 2 Enterprise Edition (J2EE) application server. Implemented the supplemental insurance, password authentication/account lockout and W4 subsystems of the application. Configured and tuned the production cluster of WebLogic J2EE application servers. Worked with other engineers to streamline and automate the application build process and integrate the JUnit Java unit testing framework into the application. Designed and implemented utility programs, including several generations of log parsers and a suite of Perl scripts to repair defects in Java Server Pages (JSP) and HTML source files.

Commerce One/AppNet/Century Computing, Laurel, MD
Software Engineer, August 1999–February 2001
Intern, October 1998–June 1999
Responsible for the XML-based form subsystem of ProcureZone.com, a multi-million dollar online procurement application for the construction industry. Designed and implemented custom software to validate the logic, layout and content of several thousand Extensible Form Description Language (XFDL) forms and trained subcontractors in the use of this validation software. Designed and implemented custom software to perform sophisticated transformations on over a million lines of XFDL code. Created the Document Type Definition for ProcureZone structured XML documents. Wrote a non-trivial context-free grammar for Interleaf's BladeRunner software to allow users to convert ProcureZone documents between Microsoft Word and XML formats.

Interactive Software Engineering (now Eiffel Software), Goleta, CA
Intern, Summer 1998
Worked with Bertrand Meyer, creator of the Eiffel programming language, on the implementation of Simple Concurrent Object-Oriented Programming (SCOOP), an experimental concurrency mechanism for Eiffel. Presented an overview of SCOOP to a group of ISE's most valued customers at the Techniques of Object-Oriented Languages and Systems (TOOLS USA) conference.