

# Brent A. Yorgey

*Curriculum Vitæ*

January 14, 2022

Hendrix College

Dept. of Mathematics & Computer Science

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## RESEARCH INTERESTS

Programming languages, functional programming, (embedded) domain-specific languages, combinatorics, category theory, type theory, dependent type systems

## EDUCATION

Ph.D. in Computer Science, University of Pennsylvania, 2008–2014

Dissertation: *Combinatorial Species and Labelled Structures*

Advisor: Dr. Stephanie Weirich

B.A. in Computer Science, *summa cum laude*, Williams College, June 2004

## AWARDS AND HONORS

Harvey Fellow

Penn Prize for Excellence in Teaching by Graduate Students, 2012

Teaching Practicum Award, University of Pennsylvania, 2010

Sam Goldberg Colloquium Prize in Computer Science, Williams College, 2004

Phi Beta Kappa

Milken Scholar

National Merit Scholar

## PROFESSIONAL EXPERIENCE

Associate Professor, August 2021–

Assistant Professor, July 2015–July 2021

Department of Mathematics and Computer Science

Hendrix College, Conway, AR

Visiting Assistant Professor

Department of Computer Science

Williams College, Williamstown, MA, July 2014–June 2015

Research/Teaching Assistant

University of Pennsylvania, Philadelphia, PA, August 2008–June 2014

Research Intern

Microsoft Research, Cambridge, England, June–August 2010

Worked on an experimental extension to the Glasgow Haskell Compiler with Simon

Peyton Jones and Dimitrios Vytiniotis.

Software Developer

Ascella Technologies / CGI Federal, Washington, DC, July 2006–July 2008

Private Math Tutor

Washington, DC, September 2006–June 2008

Computer Science and Mathematics Teacher

Woodrow Wilson Senior High School, Washington, DC, August 2004–June 2006

Research Assistant

University of Maryland, College Park, MD, Spring 2000

Created real-time data compression utilities for experiments in molecular physics using high-speed cameras.

## ACADEMIC SERVICE

Coach, Hendrix competitive programming team, 2015–present

CCSC-MidSouth Student Programming Contest co-chair, '18, '19, '20, '21

Co-Chair, ICFP Artifact Evaluation Committee '20, '21

Program committees: Haskell Implementors' Workshop '19, CCSC-MS '19, Haskell '18, CCSC-MS '18, TyDe '17 (co-chair), TyDe '16, CLA '16, TFPPIE '16, FARM '14, Haskell '12

General chair, Workshop on Functional Art, Music, Modelling and Design (FARM), September 2018

Steering Committee, Workshop on Type-Driven Development (TyDe), 2017–2019

Steering Committee, Workshop on Functional Art, Music, Modeling, and Design (FARM), November 2014–

Publicity chair, 2013 Workshop on Functional Art, Music, Modeling, and Design (FARM '13)

Co-organizer, with Paul Hudak and Conal Elliott, of a new workshop bringing together academics and practitioners interested in applications of functional programming in art and design.

Haskell core libraries committee, June 2013–June 2014

Coordinator, Penn PLClub, June 2012–July 2014

Editor, *The Monad.Reader*, October 2009–October 2011

A free electronic magazine about functional programming, targeted at the Haskell community.

Organizer, Hac  $\varphi$  (July 2009, May 2010, July 2011, August 2012, June 2013)

Open three-day meetings for collaboration on projects using the functional programming language Haskell, with around 30 attendees.

Editor, *Haskell Weekly News*, June 2008–August 2009

Collected and published a weekly gathering of news items from the Haskell programming language community.

## COMMUNITY SERVICE

Elder, Christ Church Conway, January 2020–present

Board member, Arkansas Asset Builders, December 2016–August 2018

Volunteered on the board of a local nonprofit organization providing free volunteer-prepared tax returns and financial literacy training to members of the community.

Volunteer tax preparer, Arkansas Asset Builders, February–April 2017

Haskell.org committee, October 2012–October 2014

Helped set policy and oversee use of funds for Haskell open-source community infrastructure.

Penn Alexander middle school math club, October 2009–November 2010

Volunteered to help lead middle school students in a variety of fun and engaging mathematical explorations.

## REFEREED PUBLICATIONS

Brent A. Yorgey and Kenneth Foner. What’s the difference? A functional pearl on subtracting bijections. In *Proceedings of the ACM on Programming Languages* vol. 2 issue ICFP, September 2018, p. 101.

Satvik Chauhan, Piyush P. Kurur, and Brent A. Yorgey. How to twist pointers without breaking them. In *Proceedings of the 9th International Symposium on Haskell (Haskell ’16)*, pp. 51–61.

Ryan Yates and Brent A. Yorgey. Diagrams: A Functional EDSL for Vector Graphics. In *Proceedings of the 3rd Workshop on Functional Art, Music, Modeling and Design (FARM ’15)*, pp. 2–3. Demo/tutorial abstract.

Dan Piponi and Brent A. Yorgey. Polynomial Functors Constrained by Regular Expressions. In *Proceedings of the 12th International Conference on the Mathematics of Program Construction (MPC ’15)*, pp. 113–136.

Brent A. Yorgey. Monoids: Theme and Variations (*Functional Pearl*). In *Proceedings of the 5th ACM SIGPLAN Symposium on Haskell (Haskell ’12, acceptance rate 41%)*, pp. 105–116.

Brent A. Yorgey, Stephanie Weirich, Julien Cretin, Simon Peyton Jones, Dimitrios Vytiniotis, and José Pedro Magalhães. Giving Haskell a Promotion. In *Proceedings of the 8th ACM SIGPLAN Workshop on Types in Language Design and Implementation (TLDI ’12)*, pp. 53–66.

Stephanie Weirich, Brent A. Yorgey, and Tim Sheard. Binders Unbound. In *Proceedings of the 16th ACM SIGPLAN International Conference on Functional Programming (ICFP ’11, acceptance rate 36%)*, pp. 333–345.

Brent A. Yorgey. Species and Functors and Types, Oh My! (*Functional Pearl*). In *Proceedings of the 3rd ACM SIGPLAN Symposium on Haskell (Haskell ’10, acceptance rate 39%)*, pp. 147–158.

## BOOKS

Benjamin C. Pierce, Chris Casinghino, Marco Gaboardi, Michael Greenberg, Cătălin Hrițcu, Vilhelm Sjöberg, and Brent Yorgey. *Software Foundations*. <http://www.cis.upenn.edu/~bcpierce/sf/>.

## OTHER PUBLICATIONS

Brent Yorgey. `blog :: Brent -> [String]`. <http://byorgey.wordpress.com>.

A blog aimed at the academic community, for discussing current ideas and research.

June 2007–present.

Brent Yorgey. *The Math Less Traveled*. <http://www.mathlesstraveled.com>.

A blog aimed at a broad audience, especially high school students, exploring beautiful ideas in mathematics. March 2006–present.

Brent Yorgey. *Catsters guide*. <https://byorgey.wordpress.com/catsters-guide-2/>.

An online guide to the series of 70-odd category theory video lectures put out by “The Catsters” (Eugenia Cheng and Simon Willerton).

Brent Yorgey. *The Typeclassopedia*. In: The Monad.Reader, Issue 13, March 2009.

Brent Yorgey. *Generating Multiset Partitions*. In: The Monad.Reader, Issue 8, September 2007.

## TALKS

*Disco: A Functional Teaching Language for Discrete Mathematics*.

IFIP Working Group 2.1, Meeting #78, Taiwan. March 2019.

*What’s the Difference? A Functional Pearl on Subtracting Bijections*.

International Conference on Functional Programming (ICFP). September 26, 2018.

*Graph Coloring with a SAT Solver*.

Consortium for Computing Sciences in Colleges Mid-South. April 6, 2018.

*Explaining Type Errors*.

With Richard Eisenberg and Harley Eades. Off The Beaten Track (OBT). January 13, 2018.

*Diagrams: A Functional EDSL for Vector Graphics*.

With Ryan Yates. 3rd Workshop on Functional Art, Music, Modeling and Design (FARM). September 5, 2015.

*Polynomial Functors Constrained by Regular Expressions*.

Invited talk at University of Kansas. July 16, 2015.

Mathematics of Program Construction (MPC), Königswinter, Germany. June 29, 2015.

Faculty math seminar at Williams College. March 13, 2015.

*Derivatives of Data Types, via Regular Expressions*.

Invited talk at Wesleyan University. May 5, 2015.

*Building Domain-Specific Languages and Tools*.

Hendrix College. February 27, 2015.

Grinnell College. February 9, 2015.

*Diagrams: Declarative Vector Graphics in Haskell*.

Invited talk at New York Haskell Users’ Group. November 20, 2013.

*Trees and Things (with Semirings!)*.

Invited talk at Houghton College. October 29, 2013.

Williams College. February 26, 2014.

*Functional Active Animation*.

Workshop on Functional Art, Music, Modeling and Design (FARM). September 28, 2013.

*Monoids: Theme and Variations*.

Haskell Symposium. September 13, 2012.

*Embedded, functional, compositional drawing.*

Invited talk at Williams College. April 13, 2012.

*Giving Haskell a Promotion.*

Workshop on Types in Language Design and Implementation (TLDI). January 28, 2012.

*Typed type-level programming with GHC.*

Haskell Implementors' Workshop. October 1, 2010.

*Species and Functors and Types, Oh My!*

Haskell Symposium. September 30, 2010.

*Random testing—and beyond! with combinatorial species.*

Invited talk at University of Kansas. November 24, 2009.

*Executable Mathematics: a Whirlwind Introduction to Haskell.*

Williams College. June 8, 2008.

*xmonad: a Haskell Success Story.*

FringeDC, Washington, DC. March 22, 2008.

## TEACHING

Hendrix College, 2015–

CSCI 150, Foundations of Computer Science (F'15, S'16, S'17, S'18, F'18, S'19, F'19, S'21)

CSCI 151, Data Structures (F'16, F'17, S'19)

CSCI 322, Computing Systems Organization (S'22)

CSCI 382, Algorithms (S'16, S'17, F'17, F'18, F'19, F'20)

CSCI 360, Programming Languages (F'16, F'18, S'21)

CSCI 365, Functional Programming (S'16, S'18, S'20, S'22)

CSCI 410, Senior Seminar (F'16, F'17, F'19, F'20)

MATH 240, Discrete Mathematics (S'20, S'21, S'22)

LBST 150J, The Engaged Citizen: The Art and Science of Creativity (F'20)

LBST 101, Explorations (F'18, F'20)

Williams College, 2014–2015

CS 134, Introduction to Computer Science (co-taught with Bill Lenhart, F'14)

CS 136, Data Structures and Advanced Programming (S'15)

CS 354, Functional Programming and the Art of Recursion (F'14)

University of Pennsylvania, 2008–2014

Earned teaching certificate through Penn Center for Teaching and Learning

CIS 194, Introduction to Haskell (Course designer and instructor — F'10, S'12, S'13)

CIS 399, The Art of Recursion (Course designer and instructor — F'12)

CIS 500, Software Foundations (TA — S'10, S'11)

CIS 120, Programming Languages and Techniques I (TA — F'09)

Correspondence course in precalculus with two homeschool students (Course designer and instructor — 2008–2009)

Woodrow Wilson Senior High School, Washington, DC, 2004–2006

Introduction to Computer Science ('04–'05, '05–'06)

AP Computer Science AB ('04–'05, '05–'06)

Honors Precalculus ('05-'06)  
Williams College, Williamstown, MA, 2001-2004  
Discrete Mathematics (TA, S'01)  
Computer Organization and Architecture (TA, F'01, F'02, F'03)  
Abstract Algebra (TA, S'03)  
Computational Geometry (TA, S'04)

**PERSONAL**

Excellent classical pianist. Enjoy playing bridge and go. Good reading knowledge of ancient Greek and biblical Hebrew. Ranked 12th on competitive programming website <http://open.kattis.com>.