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# HEATHER MILLER

## Citizenship

USA

## Education

***EPFL***, *Lausanne, Switzerland* *9/2009 – 9/2015*
Ph.D. in Computer Science
Advisor: Martin Odersky *2011 – 2015*

***University of Miami***, *Coral Gables, FL* *2006 – 2009*
BSEE in Electrical Engineering, Audio Engineering, *with honors, May 2009*

***Cooper Union for the Advancement of Science and Art***, *New York, NY* *2004 – 2006*

## Professional Experience

**Researcher**, ***Databricks***, *Berkeley, CA, USA* *8/2014 – 11/2014*
Supervisor: Matei Zaharia
Integrated Scala Pickling, our framework for fast, boilerplate-free, extensible serialization focused on distributed programming (OOPSLA'13) into Spark. Developed new function-passing programming model and framework.

**Research Engineer**, ***University of Utah***, *Salt Lake City, UT, USA* *5/2009 – 8/2009*
Supervisor: Prof. Dick Normann
Bioengineering Department, developed a software neural interface to stimulate the peripheral nervous system for neuroprosthetics research.

**Multimedia Engineer**, ***Arnold Center for Confluent Media Studies***,
*Coral Gables, FL, USA* *6/2007 – 12/2008*
Web development, graphic design, web design, and animation for wide array of projects from feature-length films to basic identity design.

**Research Assistant**, ***University of Minnesota***, *Minneapolis, MN, USA* *6/2008 – 8/2008*
Supervisor: Prof. Bethanie Stadler
Electrical and Computer engineering department, worked toward the development of an intravascular ultrasound transducer using magnetostrictive nanowires.

**Electronic Engineer**, ***Weeks Recording Studio***, *Coral Gables, FL, USA* *8/2006 – 8/2008*
Maintained all electronic studio equipment, from major repairs to installations to cabling.

**Sound Reinforcement Engineer**, ***University of Miami Recording Services***,
*Coral Gables, FL, USA* *1/2006 – 8/2008*
Sound reinforcement for wide variety of music acts performing in University of Miami concert halls. From solo performances and small ensembles to full orchestras.

## Teaching Experience

**Lecturer, Co-Designer**, *Reactive Programming & Parallelism* — *2015*
EPFL Undergraduate course on parallel, distributed, and asynchronous programming (~90 students)

**Lecturer, Co-Designer**, *Parallel Programming & Data Analysis* — *2015*
Upcoming Coursera MOOC on parallel, distributed, and asynchronous programming.

**Lead**, *Functional Programming Principles in Scala* — *2012 – 2014*
Popular Coursera MOOC on functional programming in Scala, with >200,000 participants to date & largest completion rate for a course its size (~19%)

- Lead teaching staff organizing a team of graduate students, managing content production, designed course exercises with cloud-hosted grading, production of lecture videos, etc
- Created extensive course analysis with interactive visualizations; led to a publication at ICSE'14

**(Lead) Teaching Assistant**, *Programming Principles* — *2011-2014*
Required EPFL undergraduate course on functional & logic programming (~160 students)

**Instructor**, *Scala as a Research Tool* — *2013*
ECOOP Tutorial

## Research Interests

Concurrent, distributed, data-centric, and data-intensive (big data) programming, from the perspective of programming languages. I work on both theoretical ideas & implementations for the Scala programming language which seek to make it easier to build distributed systems.

## Publications

**Distributed Programming via Safe Closure Passing** — *PLACES 2015*
Philipp Haller, Heather Miller
*Programming Language Approaches to Communication and Concurrency Centric Systems*

**Spores: A Type-Based Foundation for Closures in the Age of Concurrency and Distribution** — *ECOOP 2014*
Heather Miller, Philipp Haller, Martin Odersky
*European Conference on Object Oriented Programming*

**Functional Programming For All! Scaling a MOOC for Students And Professionals Alike** — *ICSE 2014*
Heather Miller, Philipp Haller, Lukas Rytz, Martin Odersky
*ACM SIGSOFT International Conference on Software Engineering*

**Instant Pickles: Generating Object-Oriented Pickler Combinators for Fast and Extensible Serialization** *OOPSLA 2013*
Heather Miller, Philipp Haller, Eugene Burmako, Martin Odersky
*ACM SIGPLAN Conference on Object Oriented Programming, Systems, Languages and Applications*

**RAY: Integrating Rx and Async for Direct-Style Reactive Streams** *REM 2013*
Philipp Haller, Heather Miller
*ACM SPLASH Workshop on Reactivity, Events and Modularity*

**FlowPools: A Lock-Free Deterministic Concurrent Dataflow Abstraction** *LCPC 2012*
Aleksandar Prokopec, Heather Miller, Tobias Schlatter, Philipp Haller, Martin Odersky
*International Workshop on Languages and Compilers for Parallel Computing*
Invited to Revised Selected Papers on the 25th International Workshop on Languages and Compilers for Parallel Computing, Lecture Notes in Computer Science, Vol. 7760, 2013

**Tools and Frameworks for Big Learning in Scala: Leveraging the Language for High Productivity and Performance** *BigLearn 2011*
Heather Miller, Philipp Haller, Martin Odersky
*NIPS Workshop on Parallel and Large-Scale Machine Learning*

**Parallelizing Machine Learning – Functionally: A Framework and Abstractions for Parallel Graph Processing** *Scala 2011*
Philipp Haller, Heather Miller
*Scala Workshop*

## Submitted/In Preparation

**Function Passing: A Model for Typed, Distributed Functional Programming**
Heather Miller, Philipp Haller

**Self-Assembly: Lightweight Language Extension and Datatype Generic Programming, All-in-One!**
Heather Miller, Philipp Haller, Bruno C. d. S. Oliveira

**Improving Human-Compiler Interaction Through Customizable Type Feedback**
Hubert Plociniczak, Heather Miller, Martin Odersky

## Selected Tech Reports

**Spores, Formally**
Heather Miller, Philipp Haller
*December 2013*

**FlowPools: A Lock-Free Deterministic Concurrent Dataflow Abstraction – Proofs**
Aleksandar Prokopec, Heather Miller, Philipp Haller
*June 2012*

## Open Source

**Scala Programming Language**, *member of the Scala team* — *2011 –*

- **Scala Spores** (Scala Improvement Proposal SIP-21), ***project lead***
  novel type-based abstraction for using closures safely
  in concurrent and distributed environments
- **Scala Pickling**, ***project lead***
  novel framework for fast, boilerplate-free, extensible serialization.
  Adopted by sbt, the most widely-used build tool for Scala. Popular
  open-source project on GitHub with >480 stars & dozens of contributors
- **Scala Futures & Promises** (Scala Improvement Proposal SIP-14), ***team member***
  unified non-blocking concurrency substrate for
  Scala, Akka, Play, and others
- **Scala Documentation**, ***creator, writer, lead maintainer***
  a central website for community-driven documentation for
  the Scala programming language and core libraries
- **Scaladoc**, ***co-maintainer***
  documentation tool for Scala's official API documentation

## Honors

| | |
|---|---|
| US National Science Foundation Graduate Research Fellowship | *2011 – 2014* |
| EPFL Outstanding Teaching Award | *2012* |
| EPFL Computer Science Fellowship | *2009 – 2010* |
| Most Outstanding Audio Engineering Student, University of Miami | *2009* |
| Most Outstanding Eta Kappa Nu Student, University of Miami | *2009* |
| Information Technology Scholarship, University of Miami | *2006 – 2009* |
| John Farina Family Scholarship, University of Miami | *2006 – 2009* |
| Eta Kappa Nu | *2008* |
| Tau Beta Pi | *2008* |
| SMART US Department of Defense Scholarship Alternate | *2007* |
| Cooper Union Full Tuition Scholarship | *2004 – 2006* |

## Selected Talks

**Function Passing Style: Typed, Distributed Functional Programming** — *Strange Loop 2014*
St. Louis, MO, USA. September 19, 2014

**Spores: A Type-Based Foundation for Closures in the Age of Concurrency and Distribution** — *ECOOP 2014*
Uppsala, Sweden. August 1, 2014

**Functional Programming For All! Scaling a MOOC for Students and Professionals Alike** — *ICSE 2014*
Hyderabad, India. June 4, 2014

**Academese to English: Scala's Type System, Dependent Types and What It Means To You** — *NEScala 2014*
New York, NY, USA. March 1, 2014

**Instant Pickles: Generating Object-Oriented Pickler** — *OOPSLA 2013*

**Combinators for Fast and Extensible Serialization**
Indianapolis, IN, USA. October 30, 2013

**PL Abstractions for Distributed Programming: Pickle Your Spores!** *Indiana University **(invited)***
Bloomington, IN, USA. October 25, 2013

**Spores: Distributable Functions in Scala** *Strange Loop 2013*
St. Louis, MO, USA. September 19, 2013

**Open Issues in Dataflow Programming** *LaME 2013 **(invited)***
Montpellier, France. July 1, 2013

**Scala as a Research Tool** *ECOOP 2013 Tutorial*
Montpellier, France. July 1, 2013

**On Pickles & Spores: Improving Scala's Support for Distributed Programming** *ScalaDays 2013*
New York, NY, USA. June 12, 2013

**Futures & Promises in Scala 2.10** *PhillyETE 2013 **(invited)***
Philadelphia, PA, USA. April 2, 2013

*I am also a frequent speaker in industry, at industrial conferences, developer "meet-ups", and everything in between. Some such events include:*

f(by) (11/2014, Minsk, Belarus), SF Scala (11/2014, SF, USA), Scalapeño (9/2014, Tel Aviv, Israel), SoundCloud TechTalks (7/2014, Berlin, Germany), **Scala Days** (6/2014, Berlin, Germany), NEScala (3/2014, NYC, USA), amongst others.

## External Service

**Curry On 2015**, organizer (co-chair) *7/2015*
**ECOOP 2015**, organizing committee member (sponsorship) *7/2015*
**PLE 2015**, program committee member *7/2015*
**DSLDI 2015**, program committee member *7/2015*
**Scala Symposium 2015**, organizer (co-chair) *6/2015*
**POPL 2015**, artifact evaluation committee member *1/2015*
**Scala Workshop 2014**, organizer (co-chair) *7/2014*
**Scala Workshop 2013**, organizer (co-chair) *7/2013*

**External Reviewer** for: ECOOP 2013, Scala 2013
**Editor of proceedings** for: Scala 2015, Scala 2014, Scala 2013

## Students Supervised[1]

**Louis Bliss**, *Incremental Picklers for Scala Pickling* *9/2013 – 1/2014*
M.Sc. level, co-supervision with Philipp Haller

**Thaddée Yann Tyl**, *Learning Scala Style* *2/2013 – 6/2013*
M.Sc. thesis

**Tobias Schlatter**, *FlowSeqs: Barrier-Free ParSeqs* *9/2012 – 1/2013*
M.Sc. level, co-supervision w/ Philipp Haller & Aleksandar Prokopec

**Tobias Schlatter**, *Multi-Lane FlowPools* *2/2012 – 6/2012*
M.Sc. level, co-supervision w/ Philipp Haller & Aleksandar Prokopec

**Pierre Grydbeck**, *Parallel Machine Learning: An Expectation Maximization Algorithm for Gaussian Mixture Models* *2/2012 – 6/2012*
M.Sc. level, co-supervision with Philipp Haller

**Bruno Studer**, *Parallel Machine Learning: Collaborative Filtering via Alternating Least Squares* *2/2012 – 6/2012*
B.Sc. level, co-supervision with Philipp Haller

**Stanislav Peshterliev**, *Parallel Natural Language Processing Algorithms in Scala* *9/2011 – 1/2012*
M.Sc. level, co-supervision with Philipp Haller

**Olivier Blanvillain & Louis Bliss**, *Parallelization of a Collaborative Filtering Algorithm with Menthor* *9/2011 – 1/2012*
B.Sc. level, co-supervision with Philipp Haller

**Florian Gysin**, *Improving Parallel Graph Processing Through the Introduction of Parallel Collections* *9/2011 – 1/2012*
M.Sc. level, co-supervision with Philipp Haller

**Georges Discry**, *Extending the Menthor Framework for Parallel Graph Processing to Distributed Computing* *2/2011 – 6/2011*
M.Sc. level, co-supervision with Philipp Haller

## References

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