Conference Schedule

Platinum Sponsors

Welcome to ICFP 2018, the 23rd ACM SIGPLAN International Conference on Functional Programming, in St. Louis, Missouri!

ICFP is a forum for sharing work on the principles and practice of functional programming. This year's conference is colocated with Strange Loop, a software-developer conference that covers a programming languages, databases, security, and distributed systems. The two conferences are being held concurrently, with the main 3-day ICFP program followed by the main 2-day Strange Loop program, and with a joint party at the City Museum in between.

This year ICFP received 120 submissions, including 18 functional pearl submissions and 8 experience report submissions. From these, the program committee selected 40 papers for presentation at the conference, including 6 functional pearls and 3 experience reports. The technical program also includes invited keynotes by Ron Garcia, Pat Hanrahan, and Eugenia Cheng.

As usual, the main ICFP conference is complemented by many affiliated events, including 12 co-hosted symposia and workshops, the ICFP Programming Contest, and the Student Research Competition. Continued from previous years is the SIGPLAN Programming Languages Mentoring Workshop (PLMW) at ICFP to help senior undergraduate and beginning graduate students pursue careers in programming-language research.

Papers presented at main ICFP conference have been accepted for publication in the Proceedings of the ACM on Programming Languages (PACMPL), a Gold Open Access journal publishing research on all aspects of programming languages. PACMPL employs a two-stage reviewing process, which allows the Review Committee to conditionally accept a paper pending specific, mandatory revisions to the paper that the reviewers check before accepting the paper.

This year's review process employed a Review Committee (RC, a.k.a. Program Committee) with 18 members plus an External Review Committee (ERC) with 43 members. Every paper was reviewed by at least two RC members and at least one ERC member, except papers with an author on the RC, which were reviewed by three ERC members that held it to a higher standard than other submissions. The RC met in person (with one remote participant) on May 10-11 in Salt Lake City. Among the 40 accepted papers, 24 were conditionally accepted, and all conditionally accepted papers were ultimately accepted. The 120 submitted papers included 12 papers with an author on the RC, and 4 of those were accepted.

For each paper that is accepted to the journal, authors are invited to submit an artifact that supports the paper's claims. Artifacts were reviewed by an Artifact Evaluation Committee (AEC) with 35 members. Papers with accepted artifacts received an "Artifact evaluated: functional" badge in the paper's published form. Each submitted artifact was reviewed by at least 2 (and in most cases 3) AEC members and discussed in a virtual meeting. For the 40 accepted papers, 27 artifacts were submitted, and 26 were accepted.

Finally, and new to ICFP in 2019, some accepted papers have been designated as Distinguished Papers. The ICFP Steering Committee (SC) introduced the Distinguished Paper designation as a way of promoting the work that appears at ICFP and as an opportunity to promote the careers of community members. The Distinguished Paper designation can be given to no more than 10% of accepted papers. While the RC and ERC obviously cannot predict which papers presented at this year's conference will turn out to be the most influential and important, the RC and ERC have taken this opportunity to call out a few papers that are particularly worth your attention. Members of the RC and ERC nominated 7 of the accepted papers for a Distinguished Paper designation, and a separate Distinguished Papers Committee (DPC) with 7 members drawn from the RC and ERC made the final decision. Each DPC member read at least 3 of the papers (in camera-ready form) and wrote a brief review, focusing on how strongly the paper should be recommended to ICFP readers. The DPC then decided on the Distinguished Paper designation for 4 papers through a virtual meeting.

We have many people to thank for this year's program. The success of ICFP relies first and foremost on the authors who submit their work for review and who present their work at the conference. The conference also relies on the work of dozens of committee members, who unfailingly devote more time and energy into organization, reviews, and publicity than is justified by any scrupulous accounting of the rewards. We would like to thank Alex Miller for working with us over several years to make the ICFP and Strange Loop colocation successful; Alex has been very generous in his support of ICFP. Last but certainly not least, we would like to thank Annabel Satin for her efforts—also over several years and on more fronts than anyone can track—to make ICFP successful.

ICFP 2018 General Chair
Robert Bruce Findler
Northwestern University, USA

ICFP 2018 Program Chair
Matthew Flatt
University of Utah, USA

ICFP 2018 Artefact Evaluation Committee Chair
Simon Marlow
Facebook, UK

Steering Committee
Derek Dreyer
Robby Findler
Matthew Flatt
Ronald Garcia
Jacques Garrigue
Jeremy Gibbons
John Hughes
Atsushi Igarashi
Mark Jones
Gabriele Keller
Lindsey Kuper
Jens Palsberg
Benjamin C. Pierce
François Pottier
Eijiro Sumii
Wouter Swierstra
Stephanie Weirich

Artifact Evaluation Committee

Martin Avanzini
Shrutarshi Basu
Jost Berthold
Aleš Bizjak
Guido Chari
Vikraman Choudhury
Robert Clifton-Everest
Jonathan DiLorenzo
Jesus Dominguez
Gian Pietro Farina
Michael Gale
Francesco Gavazzo
Mark Grebe
Armaël Guéneau
Kristoffer Just Arndal Andersen
Gowtham Kaki
David Kaloper-Meršinjak
Hsiang-Shang 'Josh' Ko
Wen Kokke
Chaitanya Koparkar
Victor Lanvin
Fengyun Liu
Simon Marlow
Liam O'Connor
Ivan Perez
Tommaso Petrucciani
Amos Robinson
Alejandro Serrano
Thomas Sewell
Thomas Sibut-Pinote
KC Sivaramakrishnan
Jacob Stanley
Marco Vassena
Theo Winterhalter
Erik de Castro Lopo

Program Committee
Sandrine Blazy
David Thrane Christiansen
Martin Elsman
Matthew Flatt
Marco Gaboardi
Sam Lindley
Heather Miller
J. Garrett Morris
Henrik Nilsson
François Pottier
Alejandro Russo
Ilya Sergey
Michael Sperber
Wouter Swierstra
Éric Tanter
Katsuhiro Ueno
Niki Vazou
Jeremy Yallop

Distinguished Papers Committee
Nada Amin
David Thrane Christiansen
Koen Claessen
Richard A. Eisenberg
J. Garrett Morris
Michael Sperber
Wouter Swierstra

External Review Committee

Michael D. Adams
Amal Ahmed
Nada Amin
Zena M. Ariola
Lars Bergstrom
Lars Birkedal
Edwin Brady
William E. Byrd
Giuseppe Castagna
Sheng Chen
Koen Claessen
Ugo Dal Lago
David Darais
Joshua Dunfield
Richard A. Eisenberg
Matthew Fluet
Nate Foster
Jurriaan Hage
Zhenjiang Hu
Suresh Jagannathan
Simon Peyton Jones
Naoki Kobayashi
Neelakantan R. Krishnaswami
Kazutaka Matsuda
Trevor L. McDonell
Hernan Melgratti
Akimasa Morihata
Aleksandar Nanevski
Kim Nguyễn
Cosmin Oancea
Bruno C. d. S. Oliveira
Tomas Petricek
Benjamin C. Pierce
Christine Rizkallah
Tom Schrijvers
Manuel Serrano
Jeremy G. Siek
Josef Svenningsson
Nicolas Tabareau
David Van Horn
Dimitrios Vytiniotis
Philip Wadler
Meng Wang

Organizing Committee

Joachim Breitner
William E. Byrd
Jose Calderon
Natalia Chechina
David Thrane Christiansen
Ravi Chugh
John Clements
Kei Davis
Richard A. Eisenberg
Sebastian Erdweg
Robby Findler
Matthew Flatt
Spencer P. Florence
Matthew Fluet
Adrian Francalanza
Ben Greenman
Alan Jeffrey
Andrew Kennedy
Lindsey Kuper
Dan Licata
Simon Marlow
Alex Miller
Akimasa Morihata
Tom Murphy
Bruno C. d. S. Oliveira
Alex Potanin
François Pottier
Donya Quick
Mike Rainey
Annabel Satin
Gabriel Scherer
Christophe Scholliers
Filip Sieczkowski
Dominic Steinitz
David Van Horn
Niki Vazou
Jamie Willis
Nicolas Wu
Brent Yorgey
Jakub Zalewski

Student Research Competition Selection Committee
Sheng Chen
Ravi Chugh
Ronghui Gu
Chris Martens
Gabriel Scherer
David Van Horn
Brent Yorgey

Student Research Competition Judges
Sheng Chen
Ravi Chugh
Tiark Rompf
Brent Yorgey

Erlang 2018 Organizing Committee
Natalia Chechina
Adrian Francalanza

Erlang 2018 Program Committee
Laura Bocchi
Richard Carlsson
Laura M. Castro
Emanuele D'Osualdo
Rocco De Nicola
James Fish
Scott Lystig Fritchie
Viktória Fördős
Tamás Kozsik
Roland Kuhn
James Larson
Rumyana Neykova
Mark Sheldon

FARM 2018 Organizing Committee
Tom Murphy
Donya Quick
Brent Yorgey

FARM 2018 Program Committee
Heinrich Apfelmus
Chuck-jee Chau
Brian Heim
Can Ince
Chris Martens
Eduardo Miranda
Ivan Perez
Iris Ren
Henning Thielemann
Didier Verna
Daniel Winograd-Cort
Halley Young

FHPC 2018 Organizing Committee

Kei Davis
Mike Rainey

FHPC 2018 Program Committee

Lennart Augustsson
Lars Bergstrom
Kei Davis
Neal Glew
Sergei Gorlatch
Jennifer Hackett
Troels Henriksen
Kiminori Matsuzaki
Atsushi Ohori
Mike Rainey
Mary Sheeran

HIW 2018 Program Committee

Edwin Brady
Joachim Breitner
Ben Gamari
Michael Hanus
Roman Leshchinskiy
Niki Vazou

HOPE 2018 Organizing Committee
François Pottier
Filip Sieczkowski

HOPE 2018 Program Committee
Danel Ahman
Stephanie Balzer
Aleš Bizjak
Shin-ya Katsumata
Ilya Sergey
Amin Timany

Haskell 2018 Program Committee

Michael D. Adams
Patrick Bahr
Olaf Chitil
Nils Anders Danielsson
Graham Hutton
Mauro Jaskelioff
Oleg Kiselyov
Sam Lindley
Andres Löh
Bruno C. d. S. Oliveira
Maciej Piróg
Wren Romano
Mark Shinwell
Niki Vazou
Marcos Viera
Nicolas Wu
Ryan Yates
Brent Yorgey

ML 2018 Program Committee

Zena M. Ariola
Jacques Garrigue
Troels Henriksen
Andrew Kennedy
Felix Klock
Ramana Kumar
Guido Martínez
Heather Miller
Gabriel Scherer
Filip Sieczkowski
Antonis Stampoulis

NPFL 2018 Organizing Committee
Dominic Steinitz

NPFL 2018 Program Committee
David Balaban
Jacques Carette
Jeremy Gibbons
Gabriele Keller
Martin Raum
Dominic Steinitz
Henning Thielemann

OCaml 2018 Program Committee

Stephen Dolan
Clark Gaebel
Andrew Kennedy
Nicolás Ojeda Bär
Jonathan Protzenko
Gabriel Scherer
Kanae Tsushima
John Whitington

PLMW @ ICFP 2018 Organizing Committee
Dan Licata
David Van Horn
Niki Vazou

Scala 2018 Steering Committee

Aggelos Biboudis
Jonathan Immanuel Brachthäuser
Paolo G. Giarrusso
Philipp Haller
Ondřej Lhoták
Heather Miller
Martin Odersky
Sandro Stucki

Scala 2018 Organizing Committee

Jonathan Immanuel Brachthäuser
Sebastian Erdweg
Bruno C. d. S. Oliveira

Scala 2018 Program Committee

Nada Amin
Jonathan Immanuel Brachthäuser
Franck Cassez
Atsushi Igarashi
Ravichandhran Madhavan
Heather Miller
Adriaan Moors
Klaus Ostermann
Aleksandar Prokopec
Sukyoung Ryu
Marco Servetto
Philippe Suter
Ross Tate
Mirko Viroli
Damien Zufferey
Tijs van der Storm

Scheme 2018 Steering Committee
William E. Byrd
William Clinger
Marc Feeley
Daniel P. Friedman
Olin Shivers

Scheme 2018 Organizing Committee
William E. Byrd
John Clements

Scheme 2018 Program Committee
Claire Alvis
William E. Byrd
Maxime Chevalier-Boisvert
John Clements
Ronald Garcia
Yukiyoshi Kameyama
Paul Steckler
Larisse Voufo

TyDe 2018 Organizing Committee
Richard A. Eisenberg
Niki Vazou

TyDe 2018 Program Committee
Guillaume Allais
Zena M. Ariola
David Darais
Richard A. Eisenberg
Jennifer Hackett
Shin-ya Katsumata
Daan Leijen
Shin-Cheng Mu
Dominic Orchard
Peter-Michael Osera
Zoe Paraskevopoulou
Alberto Pardo
Matthieu Sozeau
Niki Vazou

HIW: Invited Talk — Illinois Central

9:00 - 9:05am: *Welcome to HIW* Joachim Breitner

9:05 - 10:00am: *Invited Talk: Let's Go Mainstream with Eta!* Rahul Muttineni

HIW: GHC — Illinois Central

10:20 - 10:45am: *GHC Update* Simon Peyton Jones

10:45 - 11:10am: *Source Plugins* Matthew Pickering

11:10 - 11:35am: *Generalized Abstract GHC.Generics* Ryan Scott

11:35 - 11:43am: *Lightning talk: CodeWorld: Teaching Haskell and mathematics to children* Chris Smith

11:43 - 11:51am: *Lightning talk: CoreSpec: Verifying GHC with hs-to-coq* Antal Spector-Zabusky

11:51am - 12:00pm: *Lightning talk: The trick which makes exceptions-0.10.0 possible* Samuel Gélineau

HIW: Types — Illinois Central

1:30 - 1:55pm: *Coercion Quantification* Ningning Xie and Richard A. Eisenberg

1:55 - 2:20pm: *Type-level visible type application* My Nguyen

2:20 - 2:45pm: *Implementing Linear Haskell* Matthew Pickering and Arnaud Spiwack

2:45 - 2:53pm: *Lightning talk: Implementing a VMware Haskell Client with Extensible Records* Matthew Russell

2:53 - 3:01pm: *Lightning talk: Asterius: Bringing Haskell to WebAssembly* Shao Cheng

3:01 - 3:10pm: *Lightning talk: Perfomance impact of control flow optimization* Andreas Klebinger

HIW: Tools and Hardware — Illinois Central

3:30 - 3:55pm: *Pier: yet another Haskell build tool* Judah Jacobson

3:55 - 4:20pm: *Clash: a practical Haskell to circuit compiler* Christiaan Baaij

4:20 - 4:28pm: *Lightning talk: More Explicit Foralls in GHC* Matthew Yacavone

4:28 - 4:45pm: *GHC Community Discussion* Simon Peyton Jones

HOPE: morning-1 — Frisco+Burlington Route

9:00 - 10:00am: *A preview of a tutorial on L (polarized $\tilde{\mu}\mu$)* Kenji Maillard, Étienne Miquey, Xavier Montillet, Guillaume Munch-Maccagnoni, and Gabriel Scherer

HOPE: morning-2 — Frisco+Burlington Route

10:20 - 11:00am: *Finding fixed points faster* Michael Arntzenius

HOPE: morning-3 Frisco+Burlington Route

11:20am - 12:00pm: *A Metalanguage for Guarded Iteration* Sergey Goncharov, Christoph Rauch, and Lutz Schöder

HOPE: afternoon-1 Frisco+Burlington Route

1:30 - 2:10pm: *Functional programming with MLTS* Ulysse Gérard, Dale Miler, and Gabriel Scherer

HOPE: afternoon-2 Frisco+Burlington Route

2:30 - 3:10pm: *Taming Control Flow through Linear Effect Handlers* Daan Leijen and Jonathan Immanuel Brachthäuser

HOPE: afternoon-3 Frisco+Burlington Route

3:30 - 4:10pm: *A domain theory for statistical probabilistic programming* Ohad Kammar, Matthijs Vákár, and Sam Staton

PLMW @ ICFP: Session 1 New York Central

9:00 - 9:30am: *What an SMT solver can do for you* Nadia Polikarpova

9:30 - 10:00am: *Gradual Types* Ronald Garcia

PLMW @ ICFP: Session 2 New York Central

10:20 - 10:50am: *I'm a Young Assistant Professor: AMA. + Heather's Unsolicited Advice About Grad School* Heather Miller

10:50am - 12:00pm: *Interactive Game* Joachim Breitner and Niki Vazou

PLMW @ ICFP: Session 3 — New York Central

1:30 - 2:03pm: *How to write a Great Research Paper* Simon Peyton Jones

2:03 - 2:36pm: *Dependent Types* Stephanie Weirich

2:36 - 3:10pm: *An opinionated talk on how to give talks* Ranjit Jhala

PLMW @ ICFP: Session 4 — New York Central

3:30 - 4:30pm: *Panel Discussion: Research in Functional Programming* David Darais, Leonidas Lampropoulos, Katie Ots, Ivan Perez, and Alejandro Russo

ICFP Keynotes and Reports: Monday Keynote

Stifel Theatre

9:00 - 10:00am: *Gradual Typing* Ronald Garcia

ICFP Research Papers: Environments and Tools

Stifel Theatre

☆ 10:30 - 10:52am: *Build Systems à la Carte* Andrey Mokhov, Neil Mitchell, and Simon Peyton Jones

10:52 - 11:15am: *Keep Your Laziness in Check* Kenneth Foner, Hengchu Zhang, and Leonidas Lampropoulos

11:15 - 11:37am: *Merlin: A Language Server for OCaml (Experience Report)* Frédéric Bour, Thomas Réfis, and Gabriel Scherer

11:37am - 12:00pm: *Functional Programming for Compiling and Decompiling Computer-Aided Design* Chandrakana Nandi, James R. Wilcox, Taylor Blau, Dan Grossman, and Zachary Tatlock

ICFP Research Papers: Program Construction

Stifel Theatre

1:00 - 1:22pm: *Prototyping a Functional Language using Higher-Order Logic Programming: A Functional Pearl on Learning the Ways of λProlog/Makam* Antonis Stampoulis and Adam Chlipala

1:22 - 1:45pm: *A Type and Scope Safe Universe of Syntaxes with Binding: Their Semantics and Proofs* Guillaume Allais, Robert Atkey, James Chapman, Conor McBride, and James McKinna

1:45 - 2:07pm: *Reasonably Programmable Literal Notation* Cyrus Omar and Jonathan Aldrich

2:07 - 2:30pm: *Refunctionalization of Abstract Abstract Machines: Bridging the Gap between Abstract Abstract Machines and Abstract Definitional Interpreters (Functional Pearl)* Guannan Wei, James Decker, and Tiark Rompf

ICFP Research Papers: Continuations and Effects

Stifel Theatre

3:00 - 3:23pm: *Capturing the Future by Replaying the Past (Functional Pearl)* James Koppel, Gabriel Scherer, and Armando Solar-Lezama

3:23 - 3:46pm: *Handling Delimited Continuations with Dependent Types* Youyou Cong and Kenichi Asai

3:46 - 4:10pm: *Versatile Event Correlation with Algebraic Effects* Oliver Bračevac, Nada Amin, Guido Salvaneschi, Sebastian Erdweg, Patrick Eugster, and Mira Mezini

ICFP Research Papers: Probabilistic Programming and Learning

Stifel Theatre

☆ 4:40 - 5:02pm: *The Simple Essence of Automatic Differentiation* Conal Elliott

5:02 - 5:25pm: *Functional Programming for Modular Bayesian Inference* Adam Ścibior, Ohad Kammar, and Zoubin Ghahramani

5:25 - 5:47pm: *Contextual Equivalence for a Probabilistic Language with Continuous Random Variables and Recursion* Mitchell Wand, Ryan Culpepper, Theophilos Giannakopoulos, and Andrew Cobb

5:47 - 6:10pm: *Teaching How to Program using Automated Assessment and Functional Glossy Games (Experience Report)* José Bacelar Almeira, Alcino Cunha, Nuno Macedo, Hugo Pacheco, and José Proença

ICFP Student Research Competition: Poster Reception

Grand Hall

6:30 - 8:30pm: *SRC Poster Reception*

ICFP Keynotes and Reports: Tuesday Keynote

Stifel Theatre

9:00 - 10:00am: *The Role of Functional Programming and DSLs in Hardware* Pat Hanrahan

ICFP Research Papers: Compilation and Concurrency

Stifel Theatre

10:30 - 10:52am: *Competitive Parallelism: Getting Your Priorities Right* Stefan K. Muller, Umut Acar, and Robert Harper

10:52 - 11:15am: *Static Interpretation of Higher-Order Modules in Futhark: Functional GPU Programming in the Large* Martin Elsman, Troels Henriksen, Danil Annenkov, and Cosmin Oancea

11:15 - 11:37am: *Finitary Polymorphism for Optimizing Type-Directed Compilation* Atsushi Ohori, Katsuhiro Ueno, and Hisayuki Mima

11:37am - 12:00pm: *Fault Tolerant Functional Reactive Programming (Functional Pearl)* Ivan Perez

ICFP Keynotes and Reports: Report on ICFP and Climate Change

Stifel Theatre

12:15 - 12:50pm: *Report on ICFP and Climate Change* Benjamin C. Pierce

ICFP Research Papers: Proof Techniques and Mechanization

Stifel Theatre

1:00 - 1:22pm: *MoSeL: A General, Extensible Modal Framework for Interactive Proofs in Separation Logic* Robbert Krebbers, Jacques-Henri Jourdan, Ralf Jung, Joseph Tassarotti, Jan-Oliver Kaiser, Amin Timany, Arthur Charguéraud, and Derek Dreyer

1:22 - 1:45pm: *Mtac2: Typed Tactics for Backward Reasoning in Coq* Jan-Oliver Kaiser, Beta Ziliani, Robbert Krebbers, Yann Régis-Gianas, and Derek Dreyer

1:45 - 2:07pm: *Compositional Soundness Proofs of Abstract Interpreters* Sven Keidel, Casper Bach Poulsen, and Sebastian Erdweg

☆ 2:07 - 2:30pm: *Equivalences for Free: Univalent Parametricity for Effective Transport* Nicolas Tabareau, Éric Tanter, and Matthieu Sozeau

ICFP Research Papers: Bidirectional Programming

Stifel Theatre

3:00 - 3:22pm: *What You Needa Know about Yoneda: Profunctor Optics and the Yoneda Lemma (Functional Pearl)* Guillaume Boisseau and Jeremy Gibbons

3:22 - 3:45pm: *Incremental Relational Lenses* Rudi Horn, Roly Perera, and James Cheney

3:45 - 4:07pm: *Synthesizing Quotient Lenses* Solomon Maina, Anders Miltner, Kathleen Fisher, Benjamin C. Pierce, Dave Walker, and Steve Zdancewic

4:07 - 4:30pm: *Generic Deriving of Generic Traversals* Csongor Kiss, Matthew Pickering, and Nicolas Wu

ICFP Student Research Competition: Finalist Presentations

Stifel Theatre

5:00 - 5:40pm: *Finalist Presentations*

ICFP Programming Contest: Contest Report and Results

Stifel Theatre

5:40 - 6:10pm: *Contest Report and Results* Matthew Fluet

ICFP Keynotes and Reports: Wednesday Keynote
Stifel Theatre

9:00 - 10:00am: *Conveying the Power of Abstraction* Eugenia Cheng

ICFP Research Papers: Semantics
Stifel Theatre

10:30 - 10:52am: *Partially-Static Data as Free Extension of Algebras* Jeremy Yallop, Tamara von Glehn, and Ohad Kammar

☆ 10:52 - 11:15am: *Relational Algebra by Way of Adjunctions* Jeremy Gibbons, Fritz Henglein, Ralf Hinze, and Nicolas Wu

11:15 - 11:37am: *Strict and Lazy Semantics for Effects: Layering Monads and Comonads* Andrew Hirsch and Ross Tate

11:37am - 12:00pm: *What's the Difference? A Functional Pearl on Subtracting Bijections* Brent Yorgey and Kenneth Foner

ICFP Research Papers: Gradual Typing and Proving
Stifel Theatre

1:00 - 1:22pm: *A Spectrum of Type Soundness and Performance* Ben Greenman and Matthias Felleisen

1:22 - 1:45pm: *Casts and Costs: Harmonizing Safety and Performance in Gradual Typing* John Peter Campora, Sheng Chen, and Eric Walkingshaw

1:45 - 2:07pm: *Graduality from Embedding-Projection Pairs* Max S. New and Amal Ahmed

2:07 - 2:30pm: *Ready, Set, Verify! Applying hs-to-coq to Real-World Haskell Code (Experience Report)* Joachim Breitner, Antal Spector-Zabusky, Yao Li, Christine Rizkallah, John Wiegley, and Stephanie Weirich

ICFP Research Papers: Complexity and Bounds

Stifel Theatre

3:00 - 3:23pm: *Parallel Complexity Analysis with Temporal Session Types* Ankush Das, Jan Hoffmann, and Frank Pfenning

3:23 - 3:46pm: *Parametric Polymorphism and Operational Improvement* Jennifer Hackett and Graham Hutton

3:46 - 4:10pm: *Tight Typings and Split Bounds* Beniamino Accattoli, Stéphane Graham-Lengrand, and Delia Kesner

ICFP Research Papers: Dependent Types

Stifel Theatre

4:30 - 4:52pm: *Elaborating Dependent (Co)pattern Matching* Jesper Cockx and Andreas Abel

4:52 - 5:15pm: *Generic Zero-Cost Reuse for Dependent Types* Larry Diehl, Denis Firsov, and Aaron Stump

ICFP Keynotes and Reports: Closing Events — Stifel Theatre

5:15 - 5:30pm: *SIGPLAN Awards* Satnam Singh

5:30 - 5:40pm: *Student Research Competition Awards* Ravi Chugh

5:40 - 5:55pm: *Program Chair's Report* Matthew Flatt

5:55 - 6:00pm: *ICFP 2019 Announcement* Derek Dreyer

Social Events: Strange Loop Party — City Museum

7:00 - 9:30pm: *Strange Loop Party, ride a bus from the venue to the City Museum*

Haskell: Keynote — Illinois Central

9:00 - 9:05am: *Welcome and Chair's Report* Nicolas Wu

9:05 - 10:00am: *Neither Web nor Assembly (Invited Talk)* Andreas Rossberg

Haskell: Session 1 — Illinois Central

10:30 - 11:00am: *AutoBench: Comparing the Time Performance of Haskell Programs* Martin A. T. Handley and Graham Hutton

11:00 - 11:30am: *Autobahn 2.0: Minimizing Bangs while Maintaining Performance (System Demonstration)* Marilyn Sun and Kathleen Fisher

11:30am - 12:00pm: *Improving Typeclass Relations by Being Open* Guido Martínez, Mauro Jaskelioff, and Guido De Luca

Haskell: Session 2 — Illinois Central

1:30 - 2:00pm: *Rhine: FRP with Type-Level Clocks* Manuel Bärenz and Ivan Perez

2:00 - 2:30pm: *A High-Performance Multicore IO Manager Based on libuv (Experience Report)* Dong Han and Tao He

2:30 - 3:00pm: *Embedding Invertible Languages with Binders: A Case of the FliPpr Language* Kazutaka Matsuda and Meng Wang

Haskell: Session 3 — Illinois Central

3:30 - 4:00pm: *Ghosts of Departed Proofs (Functional Pearl)* Matt Noonan

NPFL: Keynote — Texas Special

9:00 - 10:00am: *Daisy - a framework for sound accuracy analysis and optimization of numerical programs* Eva Darulova

NPFL: Talks I — Texas Special

10:20 - 10:50am: *Hasktorch: A Comprehensive Haskell Library for Differentiable Functional Programming* Sam Stites and Austin Huang

10:50 - 11:20am: *APLicative Programming with Naperian Functors* Jeremy Gibbons

NPFL: Talks II — Texas Special

11:20am - 12:00pm: *Error analysis almost for free* Eva Richter and Matti Richter

NPFL: Talks III — Texas Special

1:30 - 2:00pm: *A Haskell Interface to Sundials via inline-c* Dominic Steinitz

2:00 - 2:30pm: *On the Calculation of Functions in the Algebra of Physical Space* Nathan Waivio

NPFL: Talks IV — Texas Special

2:30 - 3:10pm: *Manifolds as Haskell types* Justus Sagemüller

NPFL: Talks V — Texas Special

3:30 - 4:10pm: *Exact Real Arithmetic for Geometric Operations* Pavel Panchekha

OCaml: Session 1 — Frisco

9:00 - 9:05am: *Introduction* Andrew Kennedy

9:05 - 9:35am: *The OCaml Platform 1.0* Anil Madhavapeddy and Gemma Gordon

9:35 - 9:45am: *The OCaml Software Foundation* Michel Mauny and Yann Régis-Gianas

9:45 - 9:50am: *This PDF is an OCaml bytecode* Gabriel Radanne

OCaml: Session 2 — Frisco

10:20 - 10:40am: *Abusing Format for fun and profits* Gabriel Radanne and Frédéric Bour

10:40 - 11:00am: *RFCs, all the way down!* Romain Calascibetta

OCaml: Session 3 — Frisco

11:20 - 11:40am: *The Vecosek Ecosystem* Sebastien Mondet

11:40am - 12:00pm: *OCaml on the ESP32 chip: Well Typed Lightbulbs Await* Lucas Pluvinage, Sadiq Jaffer, and Anil Madhavapeddy

OCaml: Session 4 — Frisco

1:30 - 1:50pm: *Wall: rendering vector graphics with OCaml and OpenGL* Frédéric Bour

1:50 - 2:10pm: *Winning on Windows: porting the OCaml platform* David Allsopp

OCaml: Session 5 — Frisco

2:30 - 2:50pm: *R&B: Towards bringing functional programming to everyday's web programmer* Hongbo Zhang, Cristiano Calcagno, Jordan Walke, Cheng Lou, and Ricky Vetter

2:50 - 3:10pm: *MLExplain* Kévin Le Bon and Alan Schmitt

OCaml: Session 6 — Frisco

3:30 - 3:50pm: *Relit: Implementing Typed Literal Macros in Reason* Charles Chamberlain and Cyrus Omar

TyDe: Applications and Monoids — New York Central

8:45 - 8:55am: *Welcome!* Richard A. Eisenberg and Niki Vazou

8:55 - 9:15am: *Extended Abstract: F# OpenCL Type Provider* Kirill Smirenko and Semyon Grigorev

9:15 - 9:35am: *Extended Abstract: Comprehending Monoids with Class* Lionel Parreaux and Christoph E. Koch

9:35 - 10:00am: *Authenticated Modular Maps in Haskell* Victor Cacciari Miraldo, Harold Carr, Alex Kogan, Mark Moir, and Maurice Herlihy

TyDe: Types — New York Central

10:20 - 10:45am: *Typing, Representing, and Abstracting Control: Functional Pearl* Philipp Schuster and Jonathan Immanuel Brachthäuser

10:45 - 11:10am: *Extensible Type-Directed Editing* Joomy Korkut and David Thrane Christiansen

11:10 - 11:35am: *Sums of Products for Mutually Recursive Datatypes: The Appropriationist's View on Generic Programming* Victor Cacciari Miraldo and Alejandro Serrano

11:35am - 12:00pm: *Implementing Resource-Aware Safe Assembly for Kernel Probes as a Dependently-Typed DSL* Ilya Yanok and Nate Nystrom

TyDe: Keynote — New York Central

1:30 - 2:20pm: *Extrinsic vs Intrinsic Specifications, and Subset Types* K. Rustan M. Leino

TyDe: Effect Handlers & Abstract Machine

New York Central

2:20 - 2:45pm: *First Class Dynamic Effect Handlers: or, Polymorphic Heaps with Dynamic Effect Handlers* Daan Leijen

2:45 - 3:10pm: *From Algebra to Abstract Machine: A Verified Generic Construction* Carlos Tomé Cortiñas and Wouter Swierstra

TyDe: Error Messages & Contexts

New York Central

3:30 - 3:50pm: *Extended Abstract: Context Constrained Computing* Robert Atkey and James Wood

3:50 - 4:10pm: *Extended Abstract: Improving Error Messages for Dependent Types* Joseph Eremondi, Wouter Swierstra, and Jurriaan Hage

ICFP Tutorials: T01: Introduction to Programming and Proving in Cedille

Burlington Route

9:00am - 12:00pm: *T01: Introduction to Programming and Proving in Cedille* Aaron Stump, Chris Jenkins, and Colin McDonald

ICFP Tutorials: T02: Direct Manipulation Programming in Sketch-n-Sketch

Burlington Route

1:00 - 4:00pm: *T02: Direct Manipulation Programming in Sketch-n-Sketch* Ravi Chugh, Nick Collins, Brian Hempel, Justin Lubin, and Mikaël Mayer

ICFP Keynotes and Reports: Strange Loop Keynote

Stifel Theatre

4:30 - 5:20pm: *Strange Loop Keynote* Erica Joy Baker

Social Events: Industrial Reception Regency C

5:30 - 7:30pm: *Industrial Reception*

Social Events: Strange Loop Unsessions

Unsessions Room

7:00 - 10:00pm: *Strange Loop Unsessions at Union Station; see Strange Loop website for details*

Haskell: Session 4 — Illinois Central

9:00 - 9:30am: *Deriving Via: or, How to Turn Hand-Written Instances into an Anti-pattern* Baldur Blöndal, Andres Löh, and Ryan Scott

9:30 - 10:00am: *Generic Programming of All Kinds* Alejandro Serrano and Victor Cacciari Miraldo

Haskell: Session 5 — Illinois Central

10:30 - 11:00am: *Type Variables in Patterns* Richard A. Eisenberg, Joachim Breitner, and Simon Peyton Jones

11:00 - 11:30am: *The Thoralf Plugin: For Your Fancy Type Needs* Divesh Otwani and Richard A. Eisenberg

11:30am - 12:00pm: *Suggesting Valid Hole Fits for Typed-Holes (Experience Report)* Matthías Páll Gissurarson

Haskell: Session 6 — Illinois Central

1:30 - 2:00pm: *A Promise Checked Is a Promise Kept: Inspection Testing* Joachim Breitner

2:00 - 2:30pm: *Branching Processes for QuickCheck Generators* Agustín Mista, Alejandro Russo, and John Hughes

2:30 - 3:00pm: *Coherent Explicit Dictionary Application for Haskell* Thomas Winant and Dominique Devriese

Haskell: Session 7 — Illinois Central

3:30 - 3:59pm: *Theorem Proving for All: Equational Reasoning in Liquid Haskell (Functional Pearl)* Niki Vazou, Joachim Breitner, Rose Kunkel, David Van Horn, and Graham Hutton

3:59 - 4:00pm: *Closing Statement* Nicolas Wu

ML: Invited talk — New York Central

9:00 - 10:00am: *ELPI: an extension language with binders and unification variables (Invited talk)* Enrico Tassi

ML: Session 1 — New York Central

10:20 - 10:45am: *Safely Mixing OCaml and Rust* Stephen Dolan

10:45 - 11:10am: *Rust Distilled: An Expressive Tower of Languages* Aaron Weiss, Daniel Patterson, and Amal Ahmed

11:10 - 11:35am: *Generating Mutually Recursive Definitions* Jeremy Yallop and Oleg Kiselyov

11:35am - 12:00pm: *Experience Report: Type-Safe Multi-Tier Programming with Standard ML Modules* Martin Elsman, Philip Munksgaard, and Ken Friis Larsen

ML: Session 2 — New York Central

1:30 - 1:55pm: *ML as a Tactic Language, Again* Guido Martínez, Danel Ahman, Victor Dumitrescu, Nick Giannarakis, Chris Hawblitzel, Cătălin Hriţcu, Monal Narasimhamurthy, Zoe Paraskevopoulou, Clément Pit-Claudel, Jonathan Protzenko, Tahina Ramananandro, Aseem Rastogi, and Nikhil Swamy

1:55 - 2:20pm: *Design and verification of functional proof checkers* Roberto Blanco

2:20 - 2:45pm: *Disornamentation* Lucas Baudin and Didier Rémy

2:45 - 3:10pm: *Generic Programming with Combinators and Objects* Dmitrii Kosarev and Dmitri Boulytchev

ML: Session 3 — New York Central

3:30 - 4:10pm: *Programming with Abstract Algebraic Effects* Dariusz Biernacki, Maciej Piróg, Piotr Polesiuk, and Filip Sieczkowski

Scala: Keynote — Frisco

9:00 - 10:00am: *Cross-Platform Language Design in Scala.js* Sébastien Doeraene

Scala: Session 1: Scala Foundations — Frisco

10:20 - 10:42am: *Extending Scala with Records: Design, Implementation, and Evaluation* Olof Karlsson and Philipp Haller

10:42 - 11:05am: *Initialization Patterns in Dotty* Fengyun Liu, Aggelos Biboudis, and Martin Odersky

11:05 - 11:27am: *Path Dependent Types with Path-Equality* Jaemin Hong, Jihyeok Park, and Sukyoung Ryu

11:27 - 11:50am: *κDOT: Scaling DOT with Mutation and Constructors* Ifaz Kabir and Ondřej Lhoták

Scala: Student Talks 1 — Frisco

11:50am - 12:00pm: *Julia Subtyping Lessons Scala Could Learn (Student Talk)* Artem Pelenitsyn

12:00 - 12:10pm: *Scala with explicit nulls (student talk)* Abel Nieto and Ondřej Lhoták

Scala: Session 2: Scala Extensions & Parsing — Frisco

1:10 - 1:32pm: *Garnishing Parsec with Parsley* Jamie Willis and Nicolas Wu

1:32 - 1:55pm: *Interflow: Interprocedural Flow-Sensitive Type Inference and Method Duplication* Denys Shabalin and Martin Odersky

1:55 - 2:17pm: *Parser Combinators for Context-Free Path Querying* Ekaterina Verbitskaia, Ilya Kirillov, Ilya Nozkin, and Semyon Grigorev

2:17 - 2:40pm: *Truly Abstract Interfaces for Algebraic Data Types: The Extractor Typing Problem* Nicolas Stucki, Paolo G. Giarrusso, and Martin Odersky

Scala: Student Talks 2 — Frisco

2:40 - 2:50pm: *Adding polymorphic functions to Scala (Student Talk)* Guillaume Martres

2:50 - 3:00pm: *Validating Changes in Typechecking on Codebases with SemanticDB (Student talk)* Max Ovsiankin and Eugene Burmako

Scala: Session 3: DSLs & Sponsor Talk — Frisco

3:20 - 3:42pm: *A Domain-specific Language for Microservices* Jacob Donham

3:42 - 4:10pm: *SemanticDB: a common data model for Scala developer tools* Eugene Burmako

Scheme: Invited Talk 1 — Burlington Route

9:00 - 10:00am: *From Scripting to Proving: Gradual Verification with a Scheme* David Van Horn

Scheme: Session 1 — Burlington Route

10:20 - 10:40am: *Growing Schemes: Twenty Years of Scheme Requests for Implementation* Arthur Gleckler

10:40 - 11:00am: *Loop Patterns: Extension of Kleene Star Operator for More Powerful Pattern Matching against Arbitrary Data Structures* Satoshi Egi

Scheme: Session 2 — Burlington Route

11:20 - 11:40am: *Temporal Logic, μKanren, and a Time-Traveling RDF Database* Nathaniel Rudavsky-Brody

11:40am - 12:00pm: *A Surprisingly Competitive Conditional Operator: miniKanrenizing the Inference Rules of Pie* Benjamin Boskin, Weixi Ma, David Thrane Christiansen, and Daniel Friedman

Scheme: Session 3 — Burlington Route

1:30 - 1:50pm: *Racets: Faceted Execution in Racket* Kristopher Micinski, Zhanpeng Wang, and Thomas Gilray

1:50 - 2:10pm: *An Efficient Compiler for the Gradually Typed Lambda Calculus* Andre Kuhlenschmidt, Deyaaeldeen Almahallawi, and Jeremy G. Siek

Scheme: Session 4 — Burlington Route

2:30 - 2:50pm: *Schism: A Self-Hosting Scheme to WebAssembly Compiler* Eric Holk

2:50 - 3:10pm: *Tail Calling Between Code Generated by C and Native Backends* Laurent Huberdeau and Marc Feeley

Scheme: Invited Talk 2 — Burlington Route

3:30 - 4:10pm: *Rebuilding Racket on Chez Scheme: An Experience Report* Matthew Flatt

ICFP Tutorials: T03: Abstracting Gradual Typing: A Systematic Approach to Designing Gradually Typed Languages

Texas Special

9:00am - 12:00pm: *T03: Abstracting Gradual Typing: A Systematic Approach to Designing Gradually Typed Languages* Ronald Garcia and Éric Tanter

ICFP Tutorials: T04: Beluga: Programming Proofs About Formal Systems

Texas Special

1:00 - 4:00pm: *T04: Beluga: Programming Proofs About Formal Systems* Brigitte Pientka, Jacob Thomas Errington, and Aliya Hameer

ICFP Keynotes and Reports: Strange Loop Keynote

Stifel Theatre

4:30 - 5:20pm: *Strange Loop Keynote: Machine learning failures - for art!* Janelle Shane

Erlang: Opening & Keynote talk — Burlington Route

9:00 - 9:10am: *Day Openning* Adrian Francalanza and Natalia Chechina

9:10 - 10:00am: *Invited Keynote -- Distributed Erlang: From Datacenter Applications to Planetary Scale Applications* Christopher Meiklejohn

Erlang: Latest News — Burlington Route

10:20 - 11:00am: *Latest News from the OTP Team* Kenneth Lundin

Erlang: Session 1 — Burlington Route

11:20 - 11:45am: *Understanding Formal Specifications through Good Examples* Alex Gerdes, John Hughes, Nicholas Smallbone, Stefan Hanenberg, Sebastian Ivarsson, and Meng Wang

11:45am - 12:00pm: *Towards Secure Erlang Systems* Alexandre Jorge Barbosa Rodrigues and Viktória Fördős

Erlang: Session 2 — Burlington Route

1:30 - 1:55pm: *iDeA: An Immersive Debugger for Actors* Aman Shankar Mathur, Burcu Kulahcioglu Ozkan, and Rupak Majumdar

1:55 - 2:20pm: *Automatic Detection of Core Erlang Message Passing Errors* Joseph Harrison

2:20 - 2:30pm: *10 min Coffee break*

Erlang: Session 3 — Burlington Route

2:30 - 2:55pm: *Modelling Distributed Erlang within a Single Node* Stavros Aronis, Viktória Fördős, and Dániel Szoboszlay

2:55 - 3:10pm: *Modeling Erlang Processes as Petri Nets* Jörgen Brandt and Wolfgang Reisig

Erlang: Final talk and Closing — Burlington Route

3:30 - 3:55pm: *Typing the Wild in Erlang* Nachiappan Valliappan and John Hughes

3:55 - 4:10pm: *Farewell & Closing* Adrian Francalanza and Natalia Chechina

FARM: Live Coding — Jeffersonian+Knickerbocker

9:00 - 9:10am: *Welcome* Brent Yorgey, Donya Quick, and Tom Murphy

9:10 - 9:35am: *NNdef: Livecoding Digital Musical Instruments in SuperCollider using Functional Reactive Programming* Miguel Negrão

9:35 - 10:00am: *La Habra — Livecoding with Clojurescript* Sarah Groff Hennigh-Palermo

FARM: Generative Systems — Jeffersonian+Knickerbocker

10:20 - 10:45am: *Compositional Computational Constructive Critique: Or, How My Computer Learned to Appreciate Poetry* Jennifer Hackett

10:45 - 11:10am: *Chord Progressions in Haskell* Brittni Watkins

11:10 - 11:35am: *Pattern-Based Algorithmic Music with Euterpea* Donya Quick

11:35am - 12:00pm: *GAYER: A Graphical Audio plaYER in ReasonML* Cora Johnson-Roberson

FARM: Audio Jeffersonian+Knickerbocker

1:30 - 1:55pm: *Programming-by-Example for Audio: Synthesizing Digital Signal Processing Programs* Mark Santolucito, Kate Rogers, Aedan Lombardo, and Ruzica Piskac

1:55 - 2:20pm: *Call For Collaboration: The Vecosek Ecosystem* Sebastien Mondet

2:20 - 2:45pm: *Musical Steganography: Hiding Things in Music* Scott Fradkin

2:45 - 3:10pm: *(Ab)using a monadic screen-presentation EDSL as a just-intonation synth pad controller* Justus Sagemüller

FARM: Art Jeffersonian+Knickerbocker

3:30 - 3:55pm: *Abstract Nonsense* Ju Gonçalves

3:55 - 4:10pm: *Closing* Donya Quick, Brent Yorgey, and Tom Murphy

FHPC: Morning Session 1 — New York Central

8:45 - 9:00am: *Welcome and Introductions* Kei Davis and Mike Rainey

9:00 - 10:00am: *HELIX: A Case Study of a Formal Verification of High Performance Program Generation* Vadim Zaliva and Franz Franchetti

FHPC: Morning Session 2 — New York Central

10:20 - 11:20am: *Modular Acceleration: Tricky Cases of Functional High-Performance Computing* Troels Henriksen, Martin Elsman, and Cosmin Oancea

11:20am - 12:05pm: *Preventing Data Races with Refinement Types* George Stelle

FHPC: Afternoon Session 1 — New York Central

1:30 - 2:15pm: *An Efficient Compiler for Recursive Functions on Mostly-Serialized Data* Michael Vollmer, Chaitanya Koparkar, Laith Sakka, Milind Kulkarni, and Ryan R. Newton

2:15 - 3:00pm: *Comparing strategies for lightweight threading based on continuations* Kavon Farvardin and John Reppy

FHPC: Afternoon Session 2 — New York Central

3:30 - 4:15pm: *Optimizing Data Parallelism with Linear Programming in Nessie* Joseph Wingerter and John Reppy

4:15 - 5:00pm: *Optional Discussion* Kei Davis and Mike Rainey

ICFP Tutorials: T05: Purely functional UIs with Reacl
Wabash Cannonball

9:00am - 12:00pm: *T05: Purely functional UIs with Reacl* Michael Sperber

ICFP Tutorials: T06: Getting Satisfaction out of Games: Learning to use SAT solvers through puzzles and games
Frisco

9:00am - 12:00pm: *T06: Getting Satisfaction out of Games: Learning to use SAT solvers through puzzles and games* Eric Mertens and Jose Calderon

ICFP Tutorials: T07: Writing a chat system in Pony
Texas Special

9:00am - 12:00pm: *T07: Writing a chat system in Pony* Andrew Turley

ICFP Tutorials: T08: Implement your own reactive language: the ReactiveML experiment
Wabash Cannonball

1:00 - 4:00pm: *T08: Implement your own reactive language: the ReactiveML experiment* Guillaume Baudart, Louis Mandel, Cédric Pasteur, and Marc Pouzet

ICFP Tutorials: T09: Pijul, a purely functional version control system

Frisco

1:00 - 4:00pm: *T09: Pijul, a purely functional version control system.* Pierre-Étienne Meunier

ICFP Tutorials: T10: Hop.js: JavaScript multitier programming

Texas Special

1:00 - 4:00pm: *T10: Hop.js: JavaScript multitier programming* Manuel Serrano

Social Events: FARM Evening of Algorithmic Arts

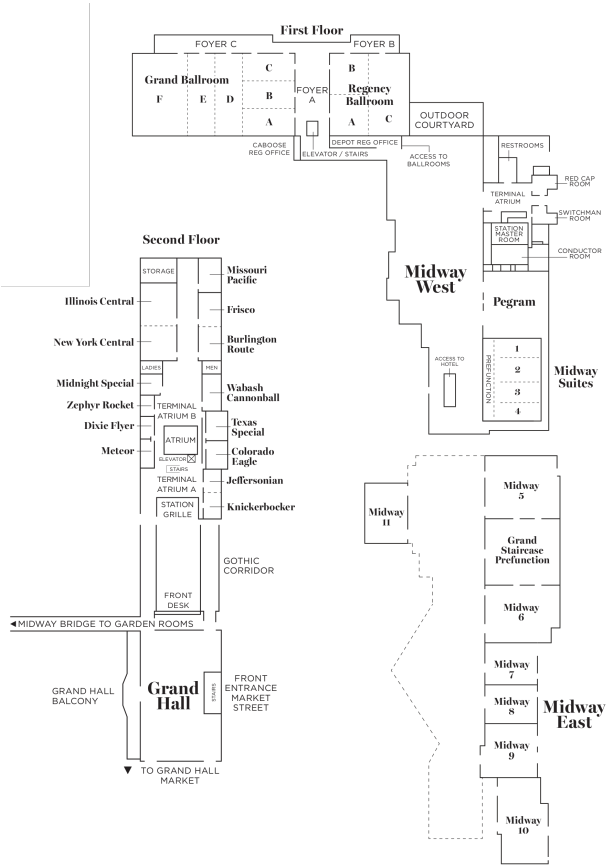
The Luminary

7:30 - 9:30pm: *FARM Evening of Algorithmic Arts*

Street Map


e Schlafly Tap Room
y Rescue of St Louis
Pear Tree Inn St. Louis Near Union Station
Aloe Plaza
St. Louis Union Station Hotel, Curio...
St. Louis Union Station...
Memorial Plaza
Soldiers' Memorial Military Museum
Kaufman Park
Stifel Theatre
Poelker Park
Enterprise Center
Union Station
Civic Center
St. Louis
Gratiot St
St Charles St
Locust St
Washington Ave
Olive St
Pine St
Market St
Clark Ave
Spruce St
Walnut St
Lucas A
N 20th St
19th St
N 18th St
N 17th St
N 16th St
N 15th St
N 14th St
S 22nd St
S 21st St
S 20th St
S 18th St
S 14th St
39
40
64
Map data ©2018 Google

Union Station Hotel Map



Haskell Symposium Sponsors

Symposium on Scala Sponsor

Haskell Implementers Workshop Sponsor

facebook

Gold Sponsors

Silver Sponsors

Bronze Sponsors

Erlang Google Intellifactory

Obsidian Systems Systor Vest Well-Typed