Overview

Nights

Table of Night Events

Page 2

Sunday 18

TyDe

Workshop on Type-Driven Development

Page 3

Scheme

Scheme and Functional Programming Workshop

Page 4

HOPE

Workshop on Higher-Order Programming with Effects

Page 5

PLMW

Programming Languages Mentoring Workshop

Page 6

Monday 19

ICFP

ICFP – Day 1

Page 7

Tuesday 20

ICFP

ICFP – Day 2

Page 8

Wednesday 21

ICFP

ICFP – Day 3

Page 9

Thursday 22

Haskell

Haskell Symposium – Day 1

Page 10

ML

ML Family Workshop

Page 11

FHPC

Workshop on Functional High-Performance Computing

Page 12

Tutorials

CUFP Tutorials on Thursday

Page 13

Friday 23

Haskell

Haskell Symposium – Day 2

Page 14

OCaml

OCaml Users and Developers Workshop

Page 15

Erlang

Erlang Workshop

Page 16

Tutorials

CUFP Tutorials on Friday

Page 17

Saturday 24

CUFP

Commercial Users of Functional Programming

Page 18

HIW

Haskell Implementors Workshop

Page 19

FARM

Functional Art, Modeling and Design

Page 20
Night Events

Monday 19
18:30 – 20:30 Welcome Reception with SRC Posters  Reception Hall 1

Tuesday 20
19:00 – 21:00 Banquet and SIGPLAN Awards  Hotel Nikko

Thursday 22
18:30 – 20:30 Industrial Reception  Reception Hall 2
18:30 All ICFP participants are welcome

Saturday 24
19:30 – 21:30 Performance Evening  Live House Beverly Hills Restaurant
19:30 FARM 2016 Performance Evening
# Workshop on Type-Driven Development

## Session One

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:15</td>
<td>Opening</td>
<td></td>
</tr>
<tr>
<td>09:35</td>
<td>APLicative Programming with Naperian Functors</td>
<td>Jeremy Gibbons</td>
</tr>
<tr>
<td>09:55</td>
<td>Choose Your Own Derivative</td>
<td>Jennifer Paykin, Antal Spector-Zabusky and Kenneth Foner</td>
</tr>
</tbody>
</table>

## Session Two

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:45</td>
<td>Generic diff3 for Algebraic Datatypes</td>
<td>Marco Vassena</td>
</tr>
<tr>
<td>11:15</td>
<td>Programming Assistance for Type-directed Programming</td>
<td>Peter-Michael Osera</td>
</tr>
<tr>
<td>11:35</td>
<td>Generic partially-static data</td>
<td>David Kaloper-Mersinjak and Jeremy Yallop</td>
</tr>
<tr>
<td>11:55</td>
<td>Bidirectional Transformations are Proof-Relevant Bisimulations</td>
<td>James McKinna</td>
</tr>
</tbody>
</table>

## Session Three

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00</td>
<td>Applications of Applicative Proof Search</td>
<td>Liam O’Connor</td>
</tr>
<tr>
<td>14:30</td>
<td>Liberating Effects with Rows and Handlers</td>
<td>Daniel Hillerström and Sam Lindley</td>
</tr>
</tbody>
</table>

## Session Four

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:30</td>
<td>Programming with Monadic CSP-Style Processes in Dependent Type Theory</td>
<td>Bashar Igried Deb Alkhawaldeh and Anton Setzer</td>
</tr>
<tr>
<td>16:00</td>
<td>Generic Lookup and Update for Infinitary Inductive-Recursive Types</td>
<td>Larry Diehl and Tim Sheard</td>
</tr>
</tbody>
</table>

## Session Five

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:00</td>
<td>Parameterized Extensible Effects and Session Types</td>
<td>Oleg Kiselyov</td>
</tr>
<tr>
<td>17:20</td>
<td>An Agda formalisation of the transitive closure of block matrices</td>
<td>Patrik Jansson and Adam Sandberg Eriksson</td>
</tr>
</tbody>
</table>
## Scheme and Functional Programming Workshop

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:15 – 10:15</td>
<td>Invited Talk</td>
<td>Opening Remarks</td>
<td>Alex Shinn</td>
</tr>
<tr>
<td>09:15</td>
<td>Invited Talk</td>
<td>A verified Lisp implementation for a verified theorem prover</td>
<td>Magnus O. Myreen</td>
</tr>
<tr>
<td>10:45 – 12:15</td>
<td>Scheming</td>
<td>A Scheme concurrency library</td>
<td>Takashi Kato</td>
</tr>
<tr>
<td>10:45</td>
<td>Scheming</td>
<td>Nash: a tracing JIT for Extension Language</td>
<td>Atsuro Hoshino</td>
</tr>
<tr>
<td>11:45</td>
<td>Scheming</td>
<td>Ghosts in the machine</td>
<td>Daniel Szmulewicz</td>
</tr>
<tr>
<td>14:00 – 15:00</td>
<td>Invited Talk</td>
<td>R7RS update</td>
<td></td>
</tr>
<tr>
<td>14:20</td>
<td>Invited Talk</td>
<td>GNU Guix: The Functional GNU/Linux Distro That’s a Scheme Library</td>
<td>Ludovic Courtès</td>
</tr>
<tr>
<td>15:30 – 16:30</td>
<td>Functional Programming</td>
<td>Function compose, Type cut, And the Algebra of logic</td>
<td>Yuheng Xie</td>
</tr>
<tr>
<td>16:00</td>
<td>Functional Programming</td>
<td>Multi-purpose web framework design based on websocket over HTTP Gateway</td>
<td>Mu Lei</td>
</tr>
<tr>
<td>17:00 – 18:00</td>
<td>Scheming</td>
<td>miniAdapton: A Minimal Implementation of Incremental Computation in Scheme</td>
<td>Dakota Fisher, Matthew Hammer, William E. Byrd and Matthew Might</td>
</tr>
<tr>
<td>17:30</td>
<td>Scheming</td>
<td>Deriving Pure, Functional One-Pass Operations for Processing Tail-Aligned Lists</td>
<td>Jason Hemann and Daniel Friedman</td>
</tr>
</tbody>
</table>
Workshop on Higher-Order Programming with Effects

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Presenters</th>
</tr>
</thead>
</table>
| 09:10 – 10:15 | Welcome and Invited Talk | Opening remarks  
Lars Birkedal and Aleksandar Nanevski  
Effective programming: bringing algebraic effects and handlers to OCaml  
Leo White | |
| 10:45 – 12:15 | Session 1 (Effects) | Effects as Capabilities  
Fengyun Liu, Nicolas Stucki, Sandro Stucki, Nada Amin and Martin Odersky  
A Logical Account of a Type-and-Effect System  
Morten Krogh-Jespersen, Kasper Svendsen and Lars Birkedal  
Simple Dependent Polymorphic I/O Effects  
Amin Timany and Bart Jacobs | |
| 14:00 – 15:00 | Session 2 (Verification) | Concurrent Data Structures Linked in Time  
Germán Andrés Delbianco, Ilya Sergey, Aleksandar Nanevski and Anindya Banerjee  
Growing a Proof Assistant  
William J. Bowman | |
| 15:30 – 16:30 | Session 3 (Compilation) | Type Directed Compilation of Row-typed Algebraic Effects  
Daan Leijen  
Administrative normal form, continued: Sharing control in direct style  
Luke Maurer, Paul Downen, Zena M. Ariola and Simon Peyton Jones | |
| 17:00 – 17:30 | Session 4 (Semantics) | Functional models of full ground, and general, reference cells  
Ohad Kammar and Sean Moss | |
Programming Languages Mentoring Workshop

09:15 – 10:15
09:15 Welcome to ICFP!
  Kathleen Fisher
09:45 Rust: PL research in industry
  Aaron Turon

10:45 – 12:15
10:45 Basic Mechanics of Operational Semantics
  David Van Horn
11:30 Some Types of Types
  Philip Wadler

14:00 – 15:00
14:00 Analyzing JavaScript Web Applications in the Wild (Mostly) Statically
  Sukyoung Ryu
14:30 Introduction to Dependent Types
  Dan Licata

15:30 – 16:30
15:30 Program Transformations for Developing Efficient and Correct Programs with Ease
  Akimasa Morihata
16:00 How to Write Papers So People Can Read Them
  Derek Dreyer

17:00 – 18:00
17:00 Principle and Practice of OCaml Type Debugger
  Kenichi Asai
17:30 Unaccustomed as I am to public speaking
  John Hughes
# ICFP – Day 1

## Keynote 1

**09:15 – 10:15**

**Eijiro Sumii**

**09:15** TensorFlow: Learning Functions at Scale  
*Martin Abadi*

## Session 1

**10:45 – 12:25**

**Akimasa Morihata**

**10:45** Farms, Pipes, Streams and Reforestation: Reasoning about Structured Parallel Processes using Types and Hylomorphisms  
*David Castro, Kevin Hammond and Susmit Sarkar*

**11:10** Dag-Calculus: A Calculus for Parallel Computation  
*Umut Acar, Arthur Charguéraud, Mike Rainey and Filip Sieczkowski*

**11:35** A Lambda-Calculus Foundation for Universal Probabilistic Programming  
*Johannes Borgström, Ugo Dal Lago, Andrew D. Gordon and Marcin Szymczak*

**12:00** Deriving a Probability Density Calculator (Functional Pearl)  
*Wazim Mohammed Ismail and Chung-chieh Shan*

## Session 2

**13:40 – 14:55**

**Kathleen Fisher**

**13:40** A New Verified Compiler Backend for CakeML  
*Yong Kiam Tan, Magnus O. Myreen, Ramana Kumar, Anthony Fox, Scott Owens and Michael Norrish*

**14:05** Sequent Calculus as a Compiler Intermediate Language  
*Paul Downen, Luke Maurer, Zena M. Ariola and Simon Peyton Jones*

**14:30** Refinement through Restraint: Bringing Down the Cost of Verification  
*Liam O’Connor, Zilin Chen, Christine Rizkallah, Sidney Amani, Japheth Lim, Toby Murray, Yutaka Nagashima, Thomas Sewell and Gerwin Klein*

## Session 3

**15:15 – 16:30**

**Neel Krishnaswami**

**15:15** Fully Abstract Compilation via Universal Embedding  
*Max New, William J. Bowman and Amal Ahmed*

**15:40** Oh Lord, Please Don’t Let Contracts Be Misunderstood (Functional Pearl)  
*Christos Dimoulas, Max New, Robby Findler and Matthias Felleisen*

**16:05** A Type Theory for Incremental Computational Complexity with Control Flow Changes  
*Ezgi Çiçek, Zoe Paraskevopoulou and Deepak Garg*

## Session 4

**17:00 – 18:15**

**Tom Schrijvers**

**17:00** Compact Bit Encoding Schemes for Simply-Typed Lambda-Terms  
*Kotaro Takeda, Naoki Kobayashi, Kazuya Yaguchi and Ayumi Shinohara*

**17:25** Queueing and Glueing for Optimal Partitioning (Functional Pearl)  
*Shin-Cheng Mu, Yu-Hsi Chiang and Yu-Han Lyu*

**17:50** All Sorts of Permutations (Functional Pearl)  
*Jan Christiansen, Nikita Danilenko and Sandra Dylus*

## Welcome Reception with SRC Posters

**18:30 – 20:30**

*Reception Hall 1*
<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Event</th>
</tr>
</thead>
</table>
| 09:15 – 10:15 | **Keynote 2**  
Gabriele Keller  
Journey to Find Bugs in JavaScript Web Applications in the Wild  
Sukyoung Ryu |
| 10:35 – 12:15 | **Session 5**  
Robby Findler  
A Glimpse of Hopjs  
*Manuel Serrano and Vincent Prunet*  
*Ilya Sergey*  
Think Like a Vertex, Behave Like a Function! A Functional DSL for Vertex-Centric Big Graph Processing  
*Kento Emoto, Kiminori Matsuzaki, Zhenjiang Hu, Akimasa Morihata and Hideya Iwasaki*  
Datafun: A Functional Datalog  
*Michael Arntzenius and Neelakantan R. Krishnaswami* |
| 13:30 – 14:45 | **Session 6**  
Johan Jeuring  
Dynamic Witnesses for Static Type Errors (or, Ill-Typed Programs Usually Go Wrong)  
*Eric L. Seidel, Ranjit Jhala and Westley Weimer*  
Automatically Disproving Fair Termination of Higher-Order Functional Programs  
*Keiichi Watanabe, Ryosuke Sato, Takeshi Tsukada and Naoki Kobayashi*  
Higher-Order Ghost State  
*Ralf Jung, Robbert Krebbers, Lars Birkedal and Derek Dreyer* |
| 15:05 – 16:20 | **Session 7**  
Andres Löh  
Unifiers as Equivalences: Proof-Relevant Unification of Dependently Typed Data  
*Jesper Cockx, Dominique Devriese and Frank Piessens*  
Elaborator Reflection: Extending Idris in Idris  
*David Christiansen and Edwin Brady*  
Partial Type Equivalences for Verified Dependent Interoperability  
*Pierre-Evariste Dagand, Nicolas Tabareau and Éric Tanter* |
| 16:50 – 17:40 | **Session 8**  
Scott Owens  
Constructive Galois Connections: Taming the Galois Connection Framework for Mechanized Metatheory  
*David Darais and David Van Horn*  
An Abstract Memory Functor for Verified C Static Analyzers  
*Sandrine Blazy, Vincent Laporte and David Pichardie* |
| 17:40 – 18:10 | **ICFP Program Chair Report and Contest Presentation**  
Program Chair Report (Eijiro Sumii)  
Programming Contest Presentation (Keisuke Nakano) |
| 19:00 – 21:00 | **Banquet and SIGPLAN Awards**  
Hotel Nikko |
## ICFP – Day 3

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:15 – 10:15</td>
<td><strong>Keynote 3</strong></td>
<td>Jacques Garrigue</td>
</tr>
</tbody>
</table>
| 09:15      | A Functional Programmer’s Guide to Homotopy Type Theory  
*Dan Licata* |                                                                         |
| 10:35 – 12:15 | **Session 9**   | Sam Lindley                                                             |
| 10:35      | Ghostbuster: A Tool for Simplifying and Converting GADTs  
*Trevor L. McDonell, Timothy A. K. Zakian, Matteo Cimini and Ryan R. Newton* |                                                                         |
| 11:00      | Indexed Codata Types  
*David Thibodeau, Andrew Cave and Brigitte Pientka* |                                                                         |
| 11:25      | Disjoint Intersection Types  
*Bruno C. d. S. Oliveira, Zhiyuan Shi and João Alpuim* |                                                                         |
| 11:50      | Set-Theoretic Types for Polymorphic Variants  
*Giuseppe Castagna, Tommaso Petrucciani and Kim Nguyen* |                                                                         |
| 13:30 – 14:45 | **Session 10** | John Reppy                                                              |
| 13:30      | Hierarchical Memory Management for Parallel Programs  
*Ram Raghunathan, Stefan K. Muller, Umut Acar and Guy Blelloch* |                                                                         |
| 13:55      | Allocation Characterizes Polyvariance: A Unified Methodology for Polyvariant Control-Flow Analysis  
*Thomas Gilray, Michael D. Adams and Matthew Might* |                                                                         |
| 14:20      | A Fully Concurrent Garbage Collector for Functional Programs on Multicore Processors  
*Katsuhiro Ueno and Atsushi Ohori* |                                                                         |
| 15:05 – 16:20 | **Session 11** | Alejandro Russo                                                         |
| 15:05      | Talking Bananas: Structural Recursion for Session Types  
*Sam Lindley and J. Garrett Morris* |                                                                         |
| 15:30      | The Best of Both Worlds: Linear Functional Programming without Compromise  
*J. Garrett Morris* |                                                                         |
| 15:55      | Context-Free Session Types  
*Peter Thiemann and Vasco Thudichum Vasconcelos* |                                                                         |
| 16:50 – 17:40 | **Session 12** | Jeremy Gibbons                                                          |
| 16:50      | Combining Effects and Coeffects via Grading  
*Marco Gaboardi, Shin-ya Katsumata, Dominic Orchard, Flavien Breuvart and Tarmo Uustalu* |                                                                         |
| 17:15      | String Diagrams for Free Monads (Functional Pearl)  
*Maciej Piróg and Nicolas Wu* |                                                                         |
| 17:40 – 18:10 | **SRC Awards and Closing** |                                                                                 |
| 17:40      | SRC Awards (David Van Horn) |                                                                                   |
| 17:55      | ICFP 2016 Closing / ICFP 2017 Presentation |                                                                                 |
# Haskell Symposium – Day 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>09:15 – 10:15</td>
<td><strong>Testing</strong></td>
</tr>
<tr>
<td>09:15</td>
<td>Welcome</td>
</tr>
</tbody>
</table>
| 09:25         | FitSpec: Refining Property Sets for Functional Testing  
                 *Rudy Braquehais and Colin Runciman*  
| 09:50         | QuickFuzz: An Automatic Random Fuzzer for Common File Formats  
                 *Gustavo Grieco, Martín Ceresa and Pablo Buiras*  
| 10:35 – 11:25 | **FRP**                |
| 10:35         | Causal Commutative Arrows Revisited  
                 *Jeremy Yallop and Hai Liu*  
| 11:00         | Functional Reactive Programming, Refactored  
                 *Ivan Perez, Manuel Barenz and Henrik Nilsson*  
| 11:45 – 12:35 | **Functors**           |
| 11:45         | Free Delivery (Functional Pearl)  
                 *Jeremy Gibbons*  
| 12:10         | How to Twist Pointers without Breaking Them  
                 *Satvik Chauhan, Piyush Kurur and Brent Yorgey*  
| 14:00 – 14:50 | **Web Technology**     |
| 14:00         | High-Performance Client-Side Web Applications through Haskell EDSLs  
                 *Anton Ekblad*  
| 14:25         | Experience Report: Developing High Performance HTTP/2 Server in Haskell  
                 *Kazuhiko Yamamoto*  
| 15:20 – 16:10 | **Language Features**  |
| 15:20         | Pattern Synonyms  
                 *Matthew Pickering, Gergo Erdi, Simon Peyton Jones and Richard Eisenberg*  
| 15:45         | Desugaring Haskell’s do-Notation into Applicative Operations  
                 *Simon Marlow, Simon Peyton Jones, Edward Kmett and Andrey Mokhov*  
| 16:40 – 18:00 | **Lightning Talks**    |
| 16:40         | Lightning Talks  

ML Family Workshop

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:10 – 10:15</td>
<td>Invited Talk</td>
<td>Welcome</td>
<td>Neelakantan R. Krishnaswami</td>
</tr>
<tr>
<td>10:35 – 11:25</td>
<td>Web</td>
<td>WebAssembly: high speed at low cost for everyone</td>
<td>Andreas Rossberg</td>
</tr>
<tr>
<td>11:45 – 12:25</td>
<td>Implementation</td>
<td>Compiling with Continuations and LLVM</td>
<td>Kavon Farvardin and John Reppy</td>
</tr>
<tr>
<td>11:45 – 12:25</td>
<td>Implementation</td>
<td>SML# with Natural Join</td>
<td>Tomohiro Sasaki, Katsuhiro Ueno and Atsushi Ohori</td>
</tr>
<tr>
<td>14:00 – 14:50</td>
<td>Effects</td>
<td>Eff Directly in OCaml</td>
<td>Oleg Kiselyov and KC Sivaramakrishnan</td>
</tr>
<tr>
<td>14:00 – 14:50</td>
<td>Effects</td>
<td>Compiling Links Effect Handlers to the OCaml Backend</td>
<td>Daniel Hillerström, Sam Lindley and KC Sivaramakrishnan</td>
</tr>
<tr>
<td>15:20 – 16:10</td>
<td>Classes</td>
<td>Classes for the Masses</td>
<td>Claudio Russo, Matthew Windsor, Don Syme, Rupert Horlick and James Clarke</td>
</tr>
<tr>
<td>15:20 – 16:10</td>
<td>Classes</td>
<td>Close Encounters of the Higher Kind - Emulating Constructor Classes in Standard ML</td>
<td>Yutaka Nagashima and Liam O’Connor</td>
</tr>
<tr>
<td>16:40 – 17:35</td>
<td>Future</td>
<td>Malfunctional Programming</td>
<td>Stephen Dolan</td>
</tr>
<tr>
<td>16:40 – 17:35</td>
<td>Future</td>
<td>Ambiguous pattern variables</td>
<td>Gabriel Scherer, Luc Maranget and Thomas Réfis</td>
</tr>
<tr>
<td>16:40 – 17:35</td>
<td>Future</td>
<td>Typed Embedding of Relational Language in OCaml</td>
<td>Dmitri Kosarev and Dmitri Boulytchev</td>
</tr>
</tbody>
</table>
Workshop on Functional High-Performance Computing

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Talks</th>
</tr>
</thead>
</table>
| 09:15  | Invited Talk             | From Identification of Parallelizability to Derivation of Parallelizable Codes  
Akimasa Morihata |
| 10:35  | Domain Specific Languages| Icicle: Write Once, Run Once  
Amos Robinson and Ben Lippmeier |
| 11:00  |                          | Using Fusion to Enable Late Design Decisions for Pipelined Computations  
Mate Karacsony and Koen Claessen |
| 11:45  | Code Generation          | Automatic Generation of Efficient Codes from Mathematical Descriptions of Stencil Computation  
Takayuki Muranushi, Seiya Nishizawa, Hirofumi Tomita, Keigo Nitadori, Masaki Iwasawa, Yutaka Maruyama, Hisashi Yashiro, Yoshifumi Nakamura, Hideyuki Hotta, Junichiro Makino, Natsuki Hosono and Hikaru Inoue |
| 12:10  |                          | JIT Costing Adaptive Skeletons for Performance Portability  
Patrick Maier, John Magnus Motron and Phil Trinder |
| 14:00  | GPUs                     | Low-Level Functional GPU Programming for Parallel Algorithms  
Martin Dybdal, Martin Elsman, Bo Joel Svensson and Mary Sheeran |
| 14:25  |                          | APL on GPUs: A TAIL from the Past, Scribbled in Futhark  
Troels Henriksen, Martin Dybdal, Henrik Urms, Anna Sofie Kiehn, Daniel Gavin, Hjalte Abelskov, Martin Elsman and Cosmin Oancea |
| 15:20  | Streaming and Dataflow  | Streaming Nested Data Parallelism on Multicores  
Frederik M. Madsen and Andrzej Filinski |
| 15:45  |                          | Polarized Data Parallel Data Flow  
Ben Lippmeier, Fil Mackay and Amos Robinson |
| 16:40  | Graph Processing         | s6raph: Vertex-Centric Graph Processing Framework with Functional Interface  
Onofre Coll Ruiz, Kiminori Matsuzaki and Shigeyuki Sato |
| 17:05  | Discussion               | Discussion |

<table>
<thead>
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| 10:35  | Domain Specific Languages | Icicle: Write Once, Run Once  
Amos Robinson and Ben Lippmeier |
| 11:00  |                  | Mate Karacsony and Koen Claessen |
| 11:45  | Code Generation  | Takayuki Muranushi, Seiya Nishizawa, Hirofumi Tomita, Keigo Nitadori, Masaki Iwasawa, Yutaka Maruyama, Hisashi Yashiro, Yoshifumi Nakamura, Hideyuki Hotta, Junichiro Makino, Natsuki Hosono and Hikaru Inoue |
| 12:10  |                  | Patrick Maier, John Magnus Motron and Phil Trinder |
| 14:00  | GPUs             | Martin Dybdal, Martin Elsman, Bo Joel Svensson and Mary Sheeran |
| 14:25  |                  | Troels Henriksen, Martin Dybdal, Henrik Urms, Anna Sofie Kiehn, Daniel Gavin, Hjalte Abelskov, Martin Elsman and Cosmin Oancea |
| 15:20  | Streaming and Dataflow | Frederik M. Madsen and Andrzej Filinski |
| 15:45  |                  | Ben Lippmeier, Fil Mackay and Amos Robinson |
| 16:40  | Graph Processing | Onofre Coll Ruiz, Kiminori Matsuzaki and Shigeyuki Sato |
| 17:05  | Discussion       | Discussion |
CUFP Tutorials on Thursday

09:15 – 12:45  **T1**  [Conference Room 6]
09:15  T1: Teaching Functional Programming
       *Michael Sperber*

09:15 – 12:45  **T2**  [Conference Room 5]
09:15  T2: Extensible Effects: understanding them, implementing them, using them
       *Oleg Kiselyov*

14:00 – 17:30  **T3**  [Conference Room 6]
14:00  T3: Introduction to OCaml
       *KC Sivaramakrishnan*

14:00 – 17:30  **T4**  [Conference Room 5]
14:00  T4: An Introduction to to Type-Level and Generic Programming in Haskell
       *Andres Löh*

18:30 – 20:30  **Industrial Reception**  [Reception Hall 2]
18:30  All ICFP participants are welcome
Haskell Symposium – Day 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenters</th>
</tr>
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<tbody>
<tr>
<td>09:25</td>
<td><strong>Strictness and STM</strong></td>
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<tr>
<td>09:25</td>
<td>Revisiting Software Transactional Memory in Haskell</td>
<td><em>Matthew Le, Ryan Yates and Matthew Fluet</em></td>
</tr>
<tr>
<td>09:50</td>
<td>Autobahn: Using Genetic Algorithms to Infer Strictness Annotations</td>
<td><em>Yisu Remy Wang, Diogenes Nunez and Kathleen Fisher</em></td>
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<tr>
<td>10:35</td>
<td><strong>Types</strong></td>
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<tr>
<td>10:35</td>
<td>Experience Report: Types for a Relational Algebra Library</td>
<td><em>Marten Agren and Lennart Augustsson</em></td>
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<td>11:00</td>
<td>Embedding Session Types in Haskell</td>
<td><em>Sam Lindley and J. Garrett Morris</em></td>
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<td>11:45</td>
<td><strong>PC Chair Report and State of Haskell</strong></td>
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<td>14:00</td>
<td><strong>Monads</strong></td>
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<tr>
<td>14:00</td>
<td>The Key Monad: Type-Safe Unconstrained Dynamic Typing</td>
<td><em>Pablo Buiras, Koen Claessen and Atze van der Ploeg</em></td>
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<tr>
<td>14:25</td>
<td>Supermonads: One Notion to Bind Them All</td>
<td><em>Jan Bracker and Henrik Nilsson</em></td>
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<tr>
<td>15:20</td>
<td><strong>Abstractions that Scale</strong></td>
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<tr>
<td>15:20</td>
<td>Non-recursive Make Considered Harmful: Build Systems at Scale</td>
<td><em>Andrey Mokhov, Neil Mitchell, Simon Peyton Jones and Simon Marlow</em></td>
</tr>
<tr>
<td>15:45</td>
<td>Lazy Graph Processing in Haskell</td>
<td><em>Philip Dexter, Yu David Liu and Kenneth Chiu</em></td>
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</table>
## OCaml Users and Developers Workshop

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>09:09</td>
<td><strong>Session 1</strong></td>
<td>Welcome</td>
<td>Mark Shinwell</td>
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<tr>
<td>09:10</td>
<td>Invited Talk</td>
<td>Damien Doligez</td>
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<tr>
<td>09:35</td>
<td>The State of the OCaml Platform: September 2016</td>
<td>Louis Gesbert</td>
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<tr>
<td>10:00</td>
<td>Learn OCaml: An Online Learning Center for OCaml</td>
<td>Benjamin Canou, Grégoire Henry, Çagdas Bozman and Fabrice Le Fessant</td>
<td></td>
</tr>
<tr>
<td>10:40</td>
<td><strong>Session 2</strong></td>
<td>Statistically profiling memory in OCaml</td>
<td>Jacques-Henri Jourdan</td>
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<tr>
<td>10:40</td>
<td></td>
<td>Lock-free programming for the masses</td>
<td>KC Sivaramakrishnan and Théo Laurent</td>
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<tr>
<td>11:45</td>
<td><strong>Session 3</strong></td>
<td>Conex – establishing trust into data repositories</td>
<td>Hannes Mehnert and Louis Gesbert</td>
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<tr>
<td>12:10</td>
<td></td>
<td>OPAM-builder: Continuous Monitoring of OPAM Repositories</td>
<td>Fabrice Le Fessant</td>
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<tr>
<td>14:00</td>
<td><strong>Session 4</strong></td>
<td>Sundials/ML: interfacing with numerical solvers</td>
<td>Timothy Bourke, Jun Inoue and Marc Pouzet</td>
</tr>
<tr>
<td>14:25</td>
<td></td>
<td>OCaml inside: a drop-in replacement for libtls</td>
<td>Enguerrand Decorne, Jeremy Yallop and David Kaloper-Mersinjak</td>
</tr>
<tr>
<td>15:20</td>
<td><strong>Session 5</strong></td>
<td>Semantics of the Lambda intermediate language</td>
<td>Pierre Chambart</td>
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<tr>
<td>15:45</td>
<td></td>
<td>Generic Programming in OCaml</td>
<td>Florent Balestrieri and Michel Mauny</td>
</tr>
<tr>
<td>16:10</td>
<td><strong>Break and Poster Session</strong></td>
<td>Inuit library: from printf to interactive user-interfaces</td>
<td>Frédéric Bour</td>
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<tr>
<td></td>
<td></td>
<td>ocp-lint, A Plugin-based Style-Checker with Semantic Patches</td>
<td>Çagdas Bozman, Théophile Hufschmitt, Michael Laporte and Fabrice Le Fessant</td>
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<tr>
<td></td>
<td></td>
<td>Partial evaluation and metaprogramming</td>
<td>Pierre Chambart</td>
</tr>
<tr>
<td>17:05</td>
<td><strong>Session 6</strong></td>
<td>Who’s got your Mail? Mr. Mime!</td>
<td>Romain Calascibetta</td>
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<tr>
<td>17:30</td>
<td></td>
<td>Improving the OCaml Web Stack: Motivations and Progress</td>
<td>Spiridon Eliopoulos</td>
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<tr>
<td>17:55</td>
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<td>Closing</td>
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</table>
## Erlang Workshop

**09:15 – 10:15**  
**Invited Keynote Talk**

09:15  
Opening & Welcome

09:25  
*María del Mar Rubio González*

**10:35 – 11:25**  
**Scalability and Distribution**

10:35  
A Scalable Reliable Instant Messenger using the SD Erlang Libraries  
*Natalia Chechina, Mario Moro Hernandez and Phil Trinder*

11:00  
CRDTs for the Configuration of Distributed Erlang Systems  
*Viktória Fördös and Francesco Cesarini*

**11:45 – 12:35**  
**Experience report presentations**

11:45  
Observing the consistency of distributed systems  
*Deepthi Devaki Akkoorath, Viktória Fördös and Annette Bieniusa*

12:10  
Making everybody comfortable with Erlang: a SCADA system for thermal control  
*Laura M. Castro, J. Daniel Fernandez and Carlos Lopez Pampín*

**14:00 – 14:50**  
**Tools**

14:00  
Profiling Actor Utilization and Communication in Akka  
*Andrea Rosà, Lydia Y. Chen and Walter Binder*

14:25  
The Nifty Way to Call Hell from Heaven  
*Andreas Löschner and Kostis Sagonas*

**15:20 – 16:10**  
**Poster presentations**

15:20  
Automatic generation of UML sequence diagrams from test counterexamples  
*Daniel Carballa and Laura M. Castro*

15:45  
Towards Semi-Automatic Data-Type Translation for Parallelism in Erlang  
*Adam Barwell, Christopher Brown, Kevin Hammond and David Castro*

**16:40 – 18:00**  
**Erlang in Robotics & Erlang Latest News**

16:40  
Towards Reliable and Scalable Robot Communication  
*Andreea Lutac, Natalia Chechina, Gerardo Aragon-Camarasa and Phil Trinder*

17:05  
Erlang latest news

17:30  
Farewell & Closing
## CUFP Tutorials on Friday

### 09:15 – 12:45  **T5**  Conference Room 6

**09:15**  T5: Fable, an F# to JavaScript compiler  
*Alfonso Garcia-Caro*

### 09:15 – 12:45  **T6**  Conference Room 5

**09:15**  T6: LiquidHaskell: Verification of Haskell Programs with SMTs  
*Niki Vazou*

### 14:00 – 17:30  **T7**  Conference Room 6

**14:00**  T7: PureScript Front-end Development  
*Brian McKenna*

### 14:00 – 17:30  **T8**  Conference Room 5

**14:00**  T8: Transforming data into GUI: a new style graphical user interface library for Haskell  
*Fumiaki Kinoshita*
Commercial Users of Functional Programming

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>09:15 – 10:15</td>
<td>Keynote</td>
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<tr>
<td>09:15</td>
<td>Opening remarks</td>
<td>Katie Ots and Alex Lang</td>
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<tr>
<td>09:20</td>
<td>Keynote</td>
<td>Yaron Minsky</td>
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<tr>
<td>10:35 – 11:25</td>
<td>Talks 1</td>
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<tr>
<td>10:35</td>
<td>Immutable Infrastructure Deployment with Haskell</td>
<td>Nick Hibberd</td>
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<tr>
<td>11:00</td>
<td>Developing a fast and durable pub/sub message bus</td>
<td>Will Sewell</td>
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<tr>
<td>11:45 – 12:35</td>
<td>Talks 2</td>
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<tr>
<td>11:45</td>
<td>Chaos testing with F# and Azure</td>
<td>Rachel Reese</td>
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<tr>
<td>12:10</td>
<td>Building a web application with continuation monads</td>
<td>Seitaro Yuki</td>
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<tr>
<td>14:00 – 14:50</td>
<td>Talks 3</td>
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<tr>
<td>14:00</td>
<td>Creating an approachable Haskell-like DSL</td>
<td>Jasper Van der Jeugt</td>
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<tr>
<td>14:25</td>
<td>The Highs and Lows of Optimising DSLs</td>
<td>Jacob Stanley</td>
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<tr>
<td>15:20 – 16:10</td>
<td>Talks 4</td>
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<tr>
<td>15:20</td>
<td>Composable Caching in Swift</td>
<td>Brandon Kase</td>
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<td>15:45</td>
<td>Guix: Scheme as a uniform OS admin and deployment interface</td>
<td>Ludovic Courtès</td>
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<tr>
<td>16:40 – 18:00</td>
<td>Talks 5</td>
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<tr>
<td>16:40</td>
<td>Baby steps to unikernels in production</td>
<td>Sean Grove</td>
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<td>17:05</td>
<td>Hope is a Monad</td>
<td>Michael Sperber</td>
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<tr>
<td>17:55</td>
<td>Closing remarks</td>
<td>Katie Ots and Alex Lang</td>
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# Haskell Implementors Workshop

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<tbody>
<tr>
<td>09:15 – 10:15</td>
<td><strong>The State of GHC</strong></td>
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<tr>
<td>09:15</td>
<td>The State of GHC</td>
<td>Simon Peyton Jones</td>
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<tr>
<td>09:45</td>
<td>Contributing to GHC</td>
<td>Ben Gamari</td>
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<tr>
<td>10:35 – 11:25</td>
<td><strong>Pluggability and Modularity</strong></td>
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<tr>
<td>10:35</td>
<td>Backpack to Work: Towards Backpack in Practice</td>
<td>Edward Z. Yang</td>
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<tr>
<td>11:00</td>
<td>More powerful GHC Plugins</td>
<td>Moritz Angermann</td>
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<tr>
<td>11:45 – 12:35</td>
<td><strong>Types and Effects</strong></td>
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<tr>
<td>11:45</td>
<td>A Dependent Haskell Triptych</td>
<td>Richard Eisenberg</td>
</tr>
<tr>
<td>12:10</td>
<td>Automatically Escaping Monads</td>
<td>Ben Lippmeier</td>
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<tr>
<td>14:00 – 14:50</td>
<td><strong>The Engineering of GHC</strong></td>
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<tr>
<td>14:00</td>
<td>Pita: Tools for making GHC fast again</td>
<td>Ben Gamari</td>
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<tr>
<td>14:25</td>
<td>GHC Determinism</td>
<td>Bartosz Nitka</td>
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<tr>
<td>15:20 – 16:10</td>
<td><strong>Backends for GHC</strong></td>
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<td>15:20</td>
<td>Remote GHCi</td>
<td>Simon Marlow</td>
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<td>15:45</td>
<td>GHCVM - A JVM Backend for GHC</td>
<td>Rahul Muttineni</td>
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<tr>
<td>16:40 – 18:00</td>
<td><strong>Trees and Lightning Talks</strong></td>
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<tr>
<td>16:40</td>
<td>Trees That Grow</td>
<td>Shayan Najd, Simon Peyton Jones and Jacques Carette</td>
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<tr>
<td>17:05</td>
<td>Lightning talks</td>
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</table>
Functional Art, Modeling and Design

09:15 – 10:15
09:15 Bithoven: Gödel Encoding of Chamber Music and Functional 8-Bit Audio Synthesis
Jay McCarthy
09:45 Structured reactive programming with polymorphic temporal tiles
Simon Archipoff and David Janin

10:35 – 11:25
10:35 Demo: Juniper: A Functional Reactive Programming Language for the Arduino
Sam Guyer and Caleb Helbling
11:00 Juniper: A Functional Reactive Programming Language for the Arduino
Caleb Helbling and Sam Guyer

11:45 – 12:35
11:45 Arrp: A Functional Language with Multi-dimensional Signals and Recurrence Equations
Jakob Leben
12:10 Demo: Klangmeister
Chris Ford

14:00 – 14:50
14:00 Demo: VoxelCAD, a collaborative voxel-based CAD tool
Csongor Kiss and Toby Shaw
14:25 o.OM: Structured-Functional Communication between Computer Music Systems using OSC and Odot
Jean Bresson, John MacCallum and Adrian Freed

15:20 – 16:10
15:20 Call for Collaboration: Computational Musicology, ????, Profit
Chris Ford
15:45 Demo: Alda: A text-based music composition language
Dave Yarwood

16:40 – 18:00
16:40 A Livecoding Semantics for Functional Reactive Programming
Tom Murphy
17:20 Demo: Epimorphism
Francis Shuman

19:30 – 21:30 Performance Evening
Live House Beverly Hills Restaurant
19:30 FARM 2016 Performance Evening
Renick Bell