Fengyun Liu

Expert on Programming Languages

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About Me

I value critical thinking, careful analysis, and the usage of simple abstractions to solve complex problems. I handle knowledge explosion by coming back to basics and reading papers by the need of projects.

Work Experience

Senior Researcher *2021.6 – 2025.3*
Oracle Labs, Switzerland

Compiler Developer for Scala *2016.3 – 2021.6*
EPFL, Switzerland

Contributions

The Scala Programming Language [1]
I work extensively on the Scala 3 compiler, Dotty, as a core contributor. I tinker with almost every part of the compiler, from parser, typer, pattern matcher to backend.

A Regressional Benchmarking Framework [2]
I conceptualized and implemented a low-maintenance, secure and flexible regressional benchmarking framework for Dotty. (1) Zero databases, all data is stored on github; (2) UI is Github static pages; (3) support test on open PRs via comments; (4) support test groups.

Exhaustivity Check
I propose a novel algorithm for checking exhaustivity of pattern matches, which is integrated in the Scala 3 compiler. The algorithm is later adopted in Swift [3] by Apple and in Dart [4] by Google.

Safe Initialization of Objects
I conduct original research on the theory and algorithms for safe object initialization in programming languages. The work produces several publications at OOPSLA and is recognized by experts as advancing the design and implementation of object-oriented programming languages.

Implicit State Machines
I propose *implicit state machines*, which is a new theoretical foundation for programming digital circuits and embedded systems. The work is accepted for publication at LCTES, recognizing its potential for innovations and broad applications.

[1] https://scala-lang.org
[2] https://github.com/lampepfl/bench
[3] https://github.com/apple/swift/pull/8908
[4] See exhaustiveness.md in https://github.com/dart-lang/language/pull/2616

EDUCATION

PhD in Computer Science — *2016.6 – 2020.6*
EPFL, Switzerland
Advisor: Prof. Martin Odersky

Master in Computer Science — *2014.9 – 2016.2*
EPFL, Switzerland

Master in Western Philosophy — *2007.9 – 2010.6*
Nanjing University, China

Bachelor in Software Engineering — *2003.9 – 2007.6*
Nanjing University, China

PUBLICATION

Initializing Global Objects: Time and Order
F. Liu, O. Lhotak, E. Xing, D. Hua, OOPSLA, 2023
Distinguished Paper Award

A Conceptual Framework for Safe Object Initialization
C. Blaudeau, F. Liu, OOPSLA, 2022

Implicit State Machines
F. Liu, A. Prokopec, LCTES, 2022

Safe Object Initialization, Abstractly
F. Liu, O. Lhotak, E. Xing, and N. C. Pham, Scala Symposium, 2021

A Type-and-Effect System for Safe Initialization
F. Liu, O. Lhotak, A. Biboudis, P. Giarrusso, M. Odersky, OOPSLA, 2020

Theory and Practice of Coroutines with Snapshots
A. Prokopec, F. Liu, ECOOP, 2018

Simplicitly: Foundations and Applications of Implicit Function Types
M. Odersky, O. Blanvillain, F. Liu, A. Biboudis, H. Miller et al, POPL, 2017

A Generic Algorithm for Checking Exhaustivity of Pattern Matching
F. Liu, Scala Symposium, 2016

SERVICE

LCTES 2023, Review Committe Member
CC 2023, Review Committe Member
Scala 2022, Review Committe Member
Scala 2020, Review Committe Member
ICFP 2019, Artefact Evaluation Committe Member
ICFP 2018, Artefact Evaluation Committe Member
PLDI 2018, Artefact Evaluation Committe Member

Reference: https://conf.researchr.org/profile/fengyunliu