## **Live Functional Programming with Typed Holes**

Extended Version\*

CYRUS OMAR, University of Chicago
IAN VOYSEY, Carnegie Mellon University
RAVI CHUGH, University of Chicago
MATTHEW A. HAMMER, University of Colorado Boulder

abstract stuff

CCS Concepts: • Software and its engineering → Functional languages;

Additional Key Words and Phrases: live programming, gradual typing, contextual modal type theory, typed holes, structured editing

<sup>\*</sup>The original version of this article was published in the POPL 2019 edition of PACMPL [?]. This extended version includes an additional appendix.

Authors' addresses: Cyrus Omar, University of Chicago, comar@cs.uchicago.edu; Ian Voysey, Carnegie Mellon University, iev@cs.cmu.edu; Ravi Chugh, University of Chicago, rchugh@cs.uchicago.edu; Matthew A. Hammer, University of Colorado Boulder, matthew.hammer@colorado.edu.

## 1 INTRODUCTION

stuff

Paper Outline. outline stuff

## 2 RELATED AND FUTURE WORK

- OCaml debugger: https://caml.inria.fr/pub/docs/manual-ocaml/debugger.html
- Tolmach's debugger for SML: https://www.cs.tufts.edu/~nr/cs257/archive/andrew-tolmach/jfp95-debugger.pdf
- Recent work by Whitington & Ridge on stepping through OCaml programs: https://github.com/johnwhitington/ocamli
- DrRacket debugger: https://docs.racket-lang.org/drracket/debugger.html
- $\bullet \ GHCi \ debugger: https://downloads.haskell.org/~ghc/7.0.1/docs/html/users\_guide/ghci-debugger. html$
- $\bullet \ Lambda Lab: https://www.cs.cornell.edu/~asampson/media/papers/lambda lab-splashe 2018-preprint. pdf \\$
- Elsa, lambda calculus evaluator: https://github.com/ucsd-progsys/elsa
- Look into Pyret debugger