

# Foundations of Type

*Programming in Mathematics*

Edward O'Callaghan



*"Foundations of Type"*

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This book is freely available at <http://victoredwardocallaghan.github.io/book/>

### ***Acknowledgment***

Thanks to github...

# Preface

## Book development

The following people participated in the development of this text.

Edward O’Callaghan

## About this book

This is a textbook that I am writing on a number of topics that have a deep unexpected connection. In particular, this book introduces programming and the foundations of mathematics from scratch by way of *homotopy type* and *category theory* and explores aspects of these topics to lead to a new era in high assurance software design and implementations.

Foundations of Type  
Edward O’Callaghan  
Australia, Jun 2013



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# Introduction

.. foo bar





## **Part I**

# **Foundations**



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..



## **Part II**

# **Mathematics**



## **Chapter 1**

# **Category theory**

..





# Appendix



# Index of symbols

$x \coloneqq a$

definition, p. 1

*From the Introduction:*

We present *Homotopy type theory* as the corner stone to understanding both mathematics and programming.

*Get a free copy of the book at <http://victoredwardocallaghan.github.io/book/>.*