SOFTWARE FOUNDATIONS

The Software Foundations series is a broad introduction to the mathematical underpinnings of reliable software.

The principal novelty of the series is that every detail is one hundred percent formalized and machine-checked: the entire text of each volume, including the exercises, is literally a "proof script" for the Coq proof assistant.

The exposition is intended for a broad range of readers, from advanced undergraduates to PhD students and researchers. No specific background in logic or programming languages is assumed, though a degree of mathematical maturity is helpful. A one-semester course can expect to cover *Logical Foundations* plus most of *Programming Language Foundations* or *Verified Functional Algorithms*, or selections from both.

Volume 1

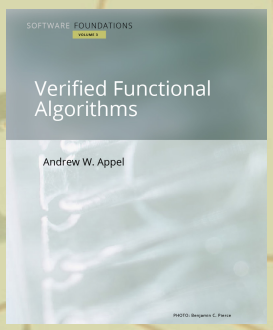
Logical Foundations **is the entry-point to the series. It covers functional programming, basic concepts of logic, computer-assisted theorem proving, and Coq.**

Volume 2

Programming Language Foundations **surveys the theory of programming languages, including operational semantics, Hoare logic, and static type systems.**

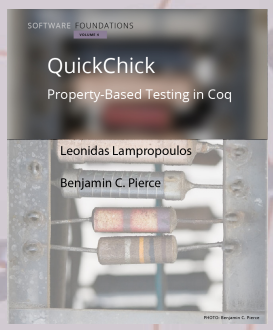
Volume 3

Verified Functional Algorithms **shows how a variety of fundamental data structures can be specified and mechanically verified.**



Volume 4

QuickChick: Property-Based Testing in Coq **introduces tools for combining randomized property-based testing with formal specification and proof in the Coq ecosystem.**



Volume 5

Verifiable C **is an extended hands-on tutorial on specifying and verifying real-world C programs using the Princeton Verified Software Toolchain.**

Volume 6

Separation Logic Foundations **is an in-depth introduction to separation logic—a practical approach to modular verification of imperative programs—and how to build program verification tools on top of it.**