1096-03-110 **Jeremy Avigad*** (avigad@cmu.edu), Carnegie Mellon University, Pittsburgh, PA 15213. *Formal verification, interactive theorem proving, and automated reasoning.*

In computer science, the phrase "formal verification" refers to the use of formal methods to verify the correctness of hardware and software with respect to a specification, and, more generally, to the use of formal methods to verify mathematical claims. "Interactive theorem proving" is one important approach, in which interactive proof assistants are used to construct formal axiomatic proofs. Although most contemporary work in formal verification is focused on industrial applications, the field promises to have a long-term impact on the development of mathematics as well, with recent developments such as Thomas Hales' *Flyspeck* project, Georges Gonthier's verification of the Feit-Thompson Odd-Order Theorem, and Vladimir Voevodsky's *Univalent foundations* project.

Formal verification relies crucially on core ideas, methods, and results from mathematical logic, drawing on foundational languages and frameworks, decision procedures, and twentieth-century proof-theoretic and model-theoretic notions. Progress in interactive theorem proving in particular now requires a deeper understanding of mathematical language, method, and proof. In this talk, I will survey the state of the art and explore the logical and conceptual issues that arise. (Received September 09, 2013)