# Acknowledgments

Many people skip over the acknowledgments when they read a book. Not me. Every book has a hidden story that isn't told by the main text. The acknowledgments give a glimpse into the *process* by which the book was created — how the ideas took shape, who was involved when, the emotional ups and downs of the author, and so on. In fact, you might say that the process of writing a thesis has a shape — but that's another thesis.

What follows is a glimpse into the story of this thesis. First, my thesis committee:

Gerry Sussman (thesis co-supervisor) and Hal Abelson (thesis reader) are ultimately responsible for this work. They created The Course (6.001, MIT's introductory computer science course) and wrote The Book (*Structure and Interpretation of Computer Programs*) that changed my life. I wasn't planning to major in computer science as an undergraduate, but after their course, I couldn't imagine doing anything else. A religious experience? You might say that.

Their book said some crazy things about computations having shape. This planted seeds in my head that germinated years later. I decided to try to make sense out of this computational shape notion. This thesis represents a checkpoint in that process. There's still a long way to go.

Gerry is the archetypical hacker, mastering everything from watch repair to solar system dynamics. His unbounded energy, infectious enthusiasm, diverse interests, and good-natured spirit recharged me again and again during the long haul of this research. Hal is simply the finest teacher and technical writer I have ever known.

Together, Gerry and Hal are the Lennon and McCartney of Computer Science. They would probably hate this title, since they'd like to be associated as little as possible with

computer science. (I'm not sure about their feelings on the Beatles.) After all, in 6.001, don't they teach that computer science is not a science, and has very little to do with computers? But like it or not, it's true. They have put out more high quality teaching and research than anyone else I have ever seen. They are the kind of pair that inspire legends, and about whom ballads are written. Everything they touch, they improve.

I learned from them that you really don't understand something unless you can boil it down into a 6.001 problem set. I hope to spend a large chunk of the rest of my life boiling things down in this manner.

David Gifford (thesis co-supervisor) got me hooked on semantics. He developed The Other Course in my life (6.821, MIT's graduate programming languages course). I have learned an immense amount about programming languages and systems while under Dave's tutelage. Over the years, Dave has provided me with lots of support, encouraged me to formalize my fuzzy ideas, and steered my thinking in more practical directions.

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Now onto my family and friends:

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