

Chapter 17

What Next?

This book leaves off well before arriving at the frontier where modern research is occurring. For those who wish to go that far, there are many possible directions, both in mathematics and in physics. But any way one eventually goes, I highly recommend reading and studying a lot.

For those who wish to learn more about the multitude of relations of geometry and topology with modern physics as of 2003, I highly recommend Nakahara's book [40]. This is definitely at least one big notch up from this book in what it requires from the reader. It may be a giant step, but it is a step in the right direction and well worth taking. There is also a lot of nice physics and mathematics material in Frankel's book [16].

Others might be interested in *supersymmetric* versions of gauge theories. Or in discrete models of gauge theories, known as *lattice gauge theory*. Or in the ongoing challenges in the quantization of gauge theories in a mathematically rigorous way. Or in the efforts for the description of all interactions in one *unified theory*, which of necessity must have some relation to gauge theory. Or looking at the problem another way, in how to describe gravity as a quantum theory having some necessary relation with the gauge theory known as the *standard model*. Or in the context of noncommutative geometry, say in a setting with quantum principal bundles.

Or maybe in a way to use principal bundles in a setting that no one has yet conceived of. That is the stuff that dreams are made of.

And I do wish you a prosperous and productive scientific future!