Preface

This is a book about the theory of topological modular forms. It is also a record of the efforts of a group of graduate students to learn that theory at the 2007 Talbot Workshop, and so a book born of and steeped in the Talbot vision.

In the fall of 2003, Mike Hopkins taught a course at MIT about tmf. Our generation of Cambridge algebraic topologists, having survived and thrived in Haynes Miller's Kan seminar, found in Mike's class our next, and really our last common, mathematical crucible. The course hacked through the theory of algebraic modular forms, formal groups, multiplicative stable homotopy theory, stacks, even more stacks, moduli stacks of elliptic curves, Bousfield localization, Morava K- and E-theory, the arithmetic and Hasse squares, André–Quillen cohomology, obstruction theory for moduli of associative and commutative ring spectra—by this point we were having dreams, or maybe nightmares, about the spiral exact sequence.

In the middle of the course, we all flew over to Münster for a week-long workshop on tmf with lectures by Mike, Haynes, Matt Ando, Charles Rezk, and Paul Goerss. A transatlantic mix of students spent the late afternoons coaxing and cramming the knowledge in at a cafe off Steinfurter Strasse; there we devised a plan to reconvene and sketched a vision of what would become the Talbot Workshops: a gathering for graduate students, focused on a single topic of contemporary research interest, lectured by graduate students and guided by a single faculty mentor, having talks in the morning and in the evening and every afternoon free for discussion and outdoor activities, with participants sleeping and lecturing and cooking together under the same roof. We pitched it to Mike and Haynes and they agreed to back a ragtag summit. Talbot was born.

Three years later, in 2007, we decided to bring Talbot home with a workshop on tmf, mentored by Mike Hopkins. Mike stopped by Staples on his way to the workshop and picked up a big red "That was easy" button. Throughout the workshop, whenever he or anyone else completed a particularly epic spectral sequence computation or stacky decomposition, he'd hit the button and a scratchy electronic voice would remind us, "That was easy!" It became the workshop joke (for much of it was evidently not easy) and mantra (for shifting perspective, whether to multiplicative stable homotopy or to stacky language or to a suitable localization, did make the intractable seem possible).

This book is a record and expansion of the material covered in the Talbot 2007 workshop. Though the authors of the various chapters have brought their own expositional perspectives to bear (particularly heroically in the case of Mark Behrens), the contemporary material in this book is due to Mike Hopkins, Haynes Miller, and Paul Goerss, with contributions by Mark Mahowald, Matt Ando, and Charles Rezk.