Preface

…by the help of Microscopes, there is nothing so small, as to escape our inquiry; hence there is a new visible World discovered to the understanding.

Robert Hooke
Micrographia, 1665

In the first edition of Cell Imaging Techniques (published in 2006), we sought to assemble a volume of imaging protocols particularly useful for those working in a core imaging facility. We chose an eclectic representation of protocols, including techniques in fluorescence microscopy, confocal microscopy, atomic force microscopy, and electron microscopy, amongst others. No one imaging mode was covered in detail, since individual volumes devoted to such techniques have been and continue to be published, and serve as invaluable reference sources for those seeking detailed protocols on a single imaging modality. In this second edition of Cell Imaging Techniques, we have reevaluated the state of microscopy-based imaging and have assembled a completely revised and expanded book. Only three updated chapters remain from the original 21, with 26 new chapters added. Familiar techniques from the first edition, such as confocal microscopy, transmission electron microscopy, atomic force microscopy, and laser microdissection, have once again been included, but with a somewhat different focus. New chapters have been added to reflect ongoing advances in imaging protocols. For instance, chapters covering colocalization analysis of fluorescent probes, correlative light and electron microscopy, environmental scanning electron microscopy, light sheet microscopy, intravital microscopy, high-throughput microscopy, and stereological techniques have now been included, just to name a few. Moreover, methods to image specific organelles, such as lipid droplets, peroxisomes, and mitochondria, as well as cellular processes such as endocytosis and autophagy have been added to this expanded second edition. Ultimately, however, the goal of this second edition of the book remains the same as that of the first: to provide an easily accessible volume of protocols to be used with a variety of imaging-based equipment likely available in a core imaging facility. We hope that by perusing this volume, investigators in academic, clinical, and industrial settings may be prompted to utilize a variety of microscopy-based imaging systems in their research, perhaps even ones they had not considered previously.

At first glance, the absence of chapters on the new super-resolution techniques may seem a glaring oversight for a volume titled Cell Imaging Techniques. However, given the rapidly evolving nature of these techniques, as well as the multiple solutions developed for sub-diffraction optical microscopy, we chose not to include them in this volume. We trust that given the global popularity of these novel methods for advanced imaging in cell biology, volumes dedicated to this specific imaging area will likely be forthcoming.
We again would like to express our sincerest appreciation to all of the authors who provided chapters for this volume; they were a pleasure to work with, providing state-of-the-art protocols and reviews in a timely fashion, while cheerfully responding to all of our queries. We would also like to thank Professor John Walker, editor of the *Methods in Molecular Biology* series, for his invaluable input and insight in all facets of the formulation of this book.

This is truly an exciting time to be involved in microscopy-based imaging, as new technologies continue to be introduced at break-neck speed. We hope you will take advantage of these imaging advances, and that this volume of protocols and reviews will serve as a bench-top companion on your journey!

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