# Acknowledgments

The roots of this volume stretch back in time to my graduate career, when Clark Glymour graciously agreed to teach a year-long seminar on Relativity at the request of the graduate students in the History and Philosophy of Science at Pitt. Without that patient and thorough presentation of modern mathematical methods, I would not have been able to start thinking about the theory in a fundamentally geometrical way. John Norton's seminars opened up the historical background going back to Newton, and Peter Machamer guided us through Galileo. John Earman and Norton had recently articulated the hole argument, and I cut my teeth puzzling over that conundrum. In sum, this book is the result of a quarter century of reflection on the teeming profusion of ideas that was the lifeblood of that remarkable program.

When I came to Rutgers in 1986, I was immeasurably fortunate to have Robert Weingard as a friend and colleague. His curiosity and intellectual honesty always made discussions a delight, and I profited from his deep knowledge of physics. This volume is dedicated with profound gratitude and affection to him.

I owe a different sort of debt to the many students, both graduate and undergraduate, whom I have had the privilege to teach over these years. The presentation of space-time theory found here has slowly evolved over many classes. At first I followed standard presentations, making extensive use of coordinates and coordinate transformations. Bit by bit, class after class, reference to coordinates dropped away, leaving the fundamental geometry open to direct inspection. The presentation of Relativity, in particular, is somewhat unorthodox but (knock wood) conceptually clear. I hope at least to save the reader from a few of the confusions that I had to struggle to overcome.

The manuscript has benefitted from feedback and comments from many quarters. I am particularly grateful to two anonymous referees: I hope they find the final version improved from the one they perused. Sean Carroll was correctly insistent that I

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At a more practical level, the time needed to complete the manuscript was afforded by a sabbatical semester at Rutgers. *Merci.*

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