

# Being a Researcher

Carlo Ghezzi

# Being a Researcher

An Informatics Perspective

 Springer

Carlo Ghezzi  
Dipartimento di Elettronica, Informazione e Bioingegneria  
Politecnico di Milano  
Milano, Italy

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*This book is dedicated to my grandchildren  
Camilla, Federico, and Alessandro. I wish  
the new world that research is creating will  
be a better place to live, for them and for  
everybody.*

# Preface

This book is about scientific research. Scientific research is the main driver of innovation in all sectors of society, and innovation *can* lead to improvement of human life and a better world for us now and for the future generations. In the modern society, scientific research is done by professional researchers. The book mainly deals with research through the researchers' perspective: why do they engage in research, what methods they follow, how do they operate in their daily life, what are their responsibilities, how do they engage with society, which ethical issues are they confronted with as professionals and in their daily research.

The book is directed to students who are considering research as a possible option for their professional life. It is also directed to in-progress researchers, in particular students who entered a doctoral program, also called philosophy doctor—PhD—program. PhD education is nowadays the main entrance door into the scientific research profession. The book is also directed to junior researchers, who are just starting their independent career after finishing their PhD. Senior researchers might also find the book useful, since it may help in their mentoring activity with students and junior researchers. Finally, the book might also be of interest to the general public, to those who may wish to understand the research eco-system and its relation to society.

In this book I have tried to condense the experience I accumulated in almost 50 years of research in an academic environment. I pass on to the reader what I learned, what many highly respected and influential colleagues have taught me, both directly and indirectly through their behaviors, and what others have written about research before me. In particular, I have tried to organize in a hopefully systematic form what I wish someone would have told me about research when I entered the research world, instead of going through the painful process of learning by personal experience and lots of errors. This book is largely not technical, but rather philosophical and sometimes even anecdotal in nature. It mixes factual information and commonly agreed knowledge about research and its methods with more personal experience and practical advice. I did my best, however, to distinguish between objective and factual concepts and data, and subjective considerations.

I wrote this book as a tribute to research, to convey my enthusiasm about it. After many years, I still consider becoming an academic as the best possible choice I could make for my professional life. No other job would have given me the same intellectual challenges, the same freedom in choosing what to work on and how to organize my work, and also the same level of responsibility. Research opened for me the doors to enter a truly international community, where I could meet with very gifted colleagues from whom I learned immensely. Most important, most of these people share and practice some fundamental values that are essential to advance science—critical thinking, fair competition, openness to diversity, non-discrimination, tolerance. Needless to say, this is not always true. Also, the evolution of the field sometimes raises worries about the future, and young researchers should strive for preserving the best values and advance them further. Research may indeed bring all of us towards a better world, but it may also be used against human values and rights.

The book is about scientific research in general. By and large what it tells holds for any field. However, it is fair to say that the different fields differ in their research culture and eco-system. For example, research in physical sciences differs from research in social sciences; both differ from research in engineering. What I say here reflects my experience (and bias) as a researcher and educator in Informatics. This field is also designated with other terms, such as Computer Science, Computing, or Information Technology. Although the different names may imply different nuances, I will consider them as equivalent in denoting a scientific field in a broad sense. The term Informatics I use is pretty standard in continental Europe.

The contents of this book reflects the experience gained in teaching this material in graduate courses and lecturing in doctoral symposia, at Politecnico di Milano, University of Zurich, TU Wien, Peking University, and at various conferences. The feedback provided by these audiences has been extremely encouraging and helped calibrate and improve the contents.

I discussed the topics of this book with friends and colleagues over many years and in many occasions. Acknowledging all those who shaped my view of research would be an impossible task. Many statements and comments in this book can probably be traced back to our past conversations. Some people, however, played a very special role while I was working on the book, and deserve my deepest and sincere gratitude: Jeff Kramer, Gian Pietro Picco, Letizia Jaccheri, Fabio Schreiber, who read draft versions, provided extremely useful and constructive comments, and also a warm encouragement; Viola Schiaffonati, especially for her thoughtful comments on research methods, philosophy of science, and ethics; Bertrand Meyer, for lively discussions and friendly differences of opinion; Domenico Bianculli, for detailed comments and invaluable help in preparing the final manuscript. Ralf Gerstner, the editor of this book, has been extremely collaborative and helpful

throughout the editorial process. Last, but not least, I wish to thank my wife Anny, for her loving and smiley support. Needless to say, all responsibilities for the actual contents of the book are only mine.

Milano, Italy  
February 2020

Carlo Ghezzi

## Post Scriptum

After I sent the final version of the book to the publisher, the Covid-19 pandemic has devastated the world, changing our lives since. Scientific research is the weapon that can help humankind to defeat the virus. But it requires that all people on Earth work together to make the world we live in a better and safer place for all.

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