# Preface

The book you hold in your hands is the outcome of the "2013 Interdisciplinary Symposium on Complex Systems" held at the historical capital of Bohemia as a continuation of our series of symposia in the science of complex systems. Prague, one of the most beautiful European cities, has its own beautiful genius loci. Here, a great number of important discoveries were made and many important scientists spent fruitful and creative years to leave unforgettable traces. The perhaps most significant period was the time of Rudolf II who was a great supporter of the art and the science and attracted a great number of prominent minds to Prague. This trend would continue. Tycho Brahe, Niels Henrik Abel, Johannes Kepler, Bernard Bolzano, August Cauchy Christian Doppler, Ernst Mach, Albert Einstein and many others followed developing fundamental mathematical and physical theories or expanding them. Thus in the beginning of the seventeenth century, Kepler formulated here the first two of his three laws of planetary motion on the basis of Tycho Brahe's observations. In the nineteenth century, nowhere differentiable continuous functions (of a fractal character) were constructed here by Bolzano along with a treatise on infinite sets, titled 'Paradoxes of Infinity' (1851). Weierstrass would later publish a similar function in 1872. In 1842, Doppler as a professor of mathematics at the Technical University of Prague here first lectured about a physical effect to bear his name later. And the epoch-making physicist Albert Einstein—while being a chaired professor of theoretical physics at the German University of Prague—arrived at the decisive steps of his later finished theory of general relativity during the years 1911–1912. In Prague, also many famous philosophers and writers accomplished their works; for instance, playwright Karel Čapek coined the word "robot" in Prague ('robot' comes from the Czech word 'robota' which means 'forced labor').

We believe that the Prague genius loci will vibe fruitfully with the conference's topic. Especially since the paradigm itself—the "Science of Complex Systems"—does not have a unique meaning so far since there still does not exist a canonical definition of the word complexity given the ongoing presence of divergent points of view. In the face of this fact we hear the reader asking us: What is the reason that we push on with our series of symposia with its amalgamation of different fields and viewpoints which sometimes do not appear consonant with each other?

We would reply with a single word: “Creation”. This answer we take from Paul Dirac who was once asked by Michael Noakes—a portrait painter of the British royal family—“Can you put into layman’s terms what you are working on, Professor?” “Creation”, was the reply he got. When Noakes, deeply amazed by such a short profound answer, asked for more explanation, he heard: “Creation was one vast bang. Talk of a steady state is nonsense.” When he tried to throw-in that if nothing had existed beforehand, what was there to bang, he would meet with an elegant evasion: “That is not a meaningful question!”

In this spirit of an anticipated but not yet existing elegance, the reader—student or professional scientist—will in the following encounter four general categories of papers in the following: Fundamental and theoretical, systemic modeling, systemic networking, and applications of various kinds. All papers represent innovative ideas, philosophical overviews or state-of-the-art applications in miscellaneous fields. At this point we would like to express our gratitude to our participants, our program committee members, and all our friends at the Czech Technical University in Prague who helped us continue our symposia at a progressive rather than “steady state” rate. We also acknowledge our keynote speakers in this year’s symposium for sharing their results: Yaneer Bar-Yam, Florentino Borondo, Robert Devaney and Stefan Thurner.

As a token of appreciation we dedicate the book to Graham Farmelo who revived Dirac’s attitude in science—“Physical laws should have mathematical beauty” and “creation means not to get locked up in a steady state”—in his penetrating 2009 biography which opens up a new way to look at the world as a single complex system.

August 2013

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http://www.springer.com/978-3-642-45437-0

ISCS 2013: Interdisciplinary Symposium on Complex Systems

Sanayei, A.; Zelinka, I.; Rössler, O.E. (Eds.)

2014, X, 400 p. 158 illus., 108 illus. in color., Hardcover
ISBN: 978-3-642-45437-0