

## **Bridging Logic, Philosophy, Computer and Cognitive Science: in the Memory of Marcin Mostowski (1955-2017)**

### **Introduction**

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This volume of *Fundamenta Informaticae* is dedicated to Professor Marcin Mostowski. It was originally intended as a Festschrift for Marcin on the occasion of his 60th birthday celebrated in 2015 with a conference organized by his students and close collaborators. Sadly, during the process of collecting the contributions, Marcin unexpectedly passed away.

Marcin studied philosophy and mathematics between 1976 and 1980, and consecutively spent most of his scientific career at the Philosophy Department of Warsaw University. In the 90s he created an informal logic group in Warsaw bringing together philosophers, mathematicians, and computer scientists. The group met at thematic seminars and most importantly, since 2000, at annual logical workshops. The workshops are a combination of a summer school and a conference, and serve the purpose of facilitating teaching advanced topics in logic to interested students, and fostering interdisciplinary debates among experts in formal methods. Participating in the workshops has quickly become one of the best paths for Poland-based researchers to establish contacts with fellow logicians. It has been particularly important for philosophy students, it is not an exaggeration to say that becoming a member of the group has been pivotal for the lives of many students (including the author of these words).

Marcin was mostly interested in mathematical logic and computational complexity theory, but his work is closely connected to fundamental questions in philosophy, psychology, and linguistics. In philosophy, he was interested in the notions of potential and actual infinity, and he developed the theory of representing arithmetic notions in finite models. In linguistics, Marcin was inspired by mathematical questions concerning definability of natural language meaning. He obtained important results in generalized quantifier theory, specifically on definability and complexity of branching quantifiers. Branching quantifiers play an important role in the study of formal semantics, where they have been proposed as a suitable model to capture the meanings of the notorious Hintikka sentences, e.g., Some relative of each villager and some relative of each townsmen hate each other. Studying complexity of concepts expressible in natural language led Marcin straight to psychological questions related to language processing, human reasoning, and cognitive difficulty. In fact, Marcin was one of the first researchers to initiate a systematic computational complexity analysis of various cognitive tasks and

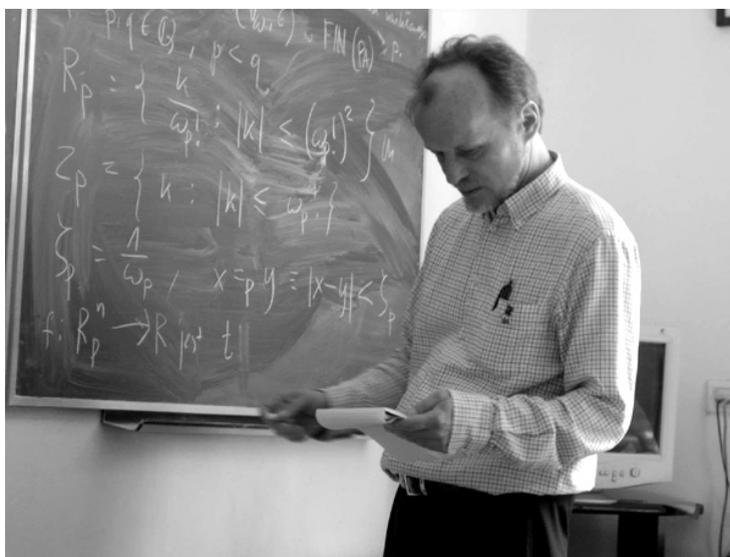
theories. He was even one of the first to explicitly formulate the version of Cobham-Edmonds Thesis for cognitive science, the so-called P-cognition Thesis, which states that human cognitive (linguistic) capacities are constrained by polynomial time computability. Following these interests, Marcin has also initiated Cognitive Science Forum in Warsaw, a monthly research seminar devoted to what these days is a mainstream scientific endeavor that goes under the name of computational cognitive modeling. This was, as far as we are aware, the first initiative of this type in Poland.

Marcin's influence reaches beyond the intellectual attractiveness of his thinking. Marcin had a rare talent of creating an intellectual and social environment that would bring people together around a common idea. His seminars were full of passion, research drive, and an exceptionally strong belief in the importance of logic, but also often accompanied by a total disregard for less important things, like administrative restrictions, schedules, or deadlines. We spent countless hours talking logic not only in a seminar room, but also in various parks, cafes, bars, and at parties.

Marcin was an extremely inspiring teacher and a great friend. His dedication to teaching and research tremendously influenced many Polish logicians and his ideas survived within the logic community he helped to create. Marcin's activity was pivotal for building bridges between mathematics and philosophy. Today, many of his students are active researchers in mathematics, computer science, philosophy, linguistics, and cognitive science. Together with their own students, they still explore research programs initiated by Marcin and regularly meet at logical workshops.

This issue of *Fundamenta Informaticae* is a testament to this. It consists of papers written by several of Marcin's former students, colleagues, and friends. The variety of topics illustrates very well Marcin's breadth of interests and scientific contributions. We are very grateful to Marcin for his creative presence in our lives, and for his inspiring academic freedom.

Jakub Szymanik



Marcin Mostowski

## Preface

The articles in this issue have been contributed by former students, collaborators, and colleagues of Marcin Mostowski. The topics reflect the main axes of Marcin's scientific investigations, including generalized quantifier theory, formal semantics, computability theory, model theory, and theoretical computer science. The papers were selected out of seven submissions. Due to an editorial mistake the paper by Eryk Kopczyński titled Computational Complexity on the Blackboard contributed to this volume has been published in another issue of the journal (Fundam. Inform. 152(4): 323-339 (2017)). The editors wish to thank all the authors of submitted papers.

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