ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

**Department of Computer Science
Information Technology and Education**

ETH Zurich
Prof. Dr. Juraj Hromkovič
Professor
CAB, F16
Universitätstrasse 6
8092 Zürich, Switzerland

Phone +41 1 632 44 08
juraj.hromkovic@inf.ethz.ch
www.abz.ethz.ch

Charles University
Faculty of Mathematics and Physics
Prague

Zurich, 13 September 2020

Report on the Habilitation thesis of Dr. Martin Mares

What are the main ingredients (including also spices) making a man a good educator? For me the most important ones are the following:

1. Deep knowledge of the subject to be taught in the historical context as well as in the context of whole science and technology.

2. The mastery of using the genesis of the topic to make it available in a fascinating way, more precisely, the ability not to teach the products of science (facts, theorems, models, methods, and technology), but rather the processes how to discover and develop them.

3. The ability to teach in a very motivating way by "learning by doing" and by "learning by getting things to work" with a high degree of guarantee of success for everybody willing to take actively part in the journey.

4. (last but NOT least) - to love teaching as well as the scientific discipline to be taught.

Dr. Mares proved with his chapters of the textbook (his Habilitation thesis) that he possesses all the ingredients listed above.

The candidate starts by listing great textbooks with high impact on teaching computer science in the universities all over the world. His textbook reaches the same quality, and it is a great pity that it is not available in other languages as well. I enjoyed reading very much. Developing things in small steps by solving sequences of interesting challenges and enabling a deep insight in the creative processes of searching for solutions fascinates readers. Already the first small motivating algorithmic problems (challenges) offer nontrivial insight into the way of thinking of an algorithm designer and offer general strategies for attacking computing problems. And if the novice reader thinks "Now I have the optimal (most efficient) strategy", then a surprise is coming that makes everything still essentially better. I am sure that this way of teaching can fascinate the students and light flames that cannot be extinguished anymore. I do not want

to comment on all places I enjoyed the reading, because they are too many. Instead, I mention the Fourier transform which is a powerful instrument in "uncountable" (at least I cannot list all of them) number of different situations and problem settings. Learning from failures one could call the approach presented here. For me this is the best approach to discover this instrument I ever saw. Additionally, the approach of Dr. Mares teaches that the representation of objects is the kernel for efficient work with them and that sometimes it is helpful to switch from one representation to another.

Following system Turnitin, there is no overlap of the thesis with texts of other scientists. The only overlap is with his own textbook (lecture notes). There is no doubt, the habilitation thesis of Dr. Martin Mares is from the didactic point of view a highly original work that essentially contributes to the quality of education at your university.

Summarizing, I congratulate the department for having such a great teacher. I give my warmest recommendation to accept the corresponding chapters of the textbook "Pruvodce labyrintem algoritmu" as a Habilitation thesis.