In Memoriam: Ingo Wegener

On the 26th of November, Ingo Wegener died after a long fight with cancer. He was only 57 years old. His death is a tragic loss for everybody who knew him and for the scientific community, in particular the evolutionary computation community.

Ingo Wegener was born on the fourth of December 1950 in Bremen, Germany. He studied mathematics at the University of Bielefeld where he obtained his PhD and his habilitation in 1978 and 1981, respectively. His research area was the complexity of Boolean functions. From 1980 to 1987 he was an associate professor at the University of Frankfurt. In 1987 he became a full professor at the Technische Universität Dortmund, heading the group of complexity theory and efficient algorithms. The honors and awards he received are too numerous to mention. Being appointed to the German Council of Science and Humanities as well as receiving the most important and prestigious German award for computer scientists, the Konrad-Zuse-Medaille, suffice as examples. In any case, it was his research he cared about, not awards. Among the eight books he authored is *The Complexity of Boolean Functions* (Wegener, 1987), an important standard textbook. He continued his research in theoretical computer science, concerned with efficient algorithms and the complexity of Boolean functions. In 2000 he published *Branching Programs and Binary Decision Diagrams* (Wegener, 2000), another important textbook. In 1996, as an established, important, and respected researcher in these fields, he was bold enough to make a step into an area of research that was completely new to him at this point of time: evolutionary computation.

In evolutionary computation, Ingo Wegener did not follow the path of research that was laid out at that point in time. Instead, he used his knowledge from the analysis of efficient algorithms, from complexity theory, and from mathematics to establish a new and important kind of research in the field. He performed a theoretical analysis of the performance of evolutionary algorithms different from what had gone before in several ways. The analysis performed is of complete *mathematical rigor*, not making use of any unproven assumptions, and not considering models that differ from the real algorithm in an uncontrolled way, and further, not making use of any estimations without proving bounds on the error introduced by them. The analysis takes into account not single example functions but meaningful *classes of functions*. Such classes may consist of functions where the evolutionary algorithm under consideration performs provably equal (Droste et al., 2006) or they may be defined by some meaningful properties (Wegener and Witt, 2005). Finally, his analyses go far beyond the concrete evolutionary algorithms and classes of fitness functions under consideration. They contribute directly to the *development of methods* for the analysis of evolutionary algorithms. In addition to establishing rigorous analysis of evolutionary algorithms as an important direction of research, he was the first to extend this kind of research to classical combinatorial optimization problems. A best paper award at PPSN 2002 (Scharnow et al., 2002) demonstrates that this was greatly appreciated in the community. This appreciation continued as best paper awards at GECCO demonstrate, in 2005 for another study of a combinatorial optimization problem (Neumann and Wegener, 2005), in 2006

for connecting evolutionary algorithms in a meaningful way to simulated annealing (Jansen and Wegener, 2006), and in 2008 for important complexity theoretical insights (Dietzfelbinger et al., 2008).

Ingo Wegener was not only a very productive and important researcher, he was also a most wonderful teacher. In various papers he presented methods for the analysis of evolutionary algorithms in easily accessible form and addressed the evolutionary computation community (Beyer et al., 2002; Wegener, 2002) as well as the theoretical computer science community (Wegener, 2001, 2003). Also, he taught those methods to researchers at GECCO in tutorials (2003, 2004, and 2005). And, perhaps most of all, he passed on his knowledge and his inspiring enthusiasm about his work to his students, supervising well beyond 100 diploma theses, 19 dissertations, and 8 habilitations. More than in all his important results, it is in these researchers whom he inspired that he will live on.

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