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# Siegfried Gottwald (1943-2015)

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Figure 1: Siegfried Gottwald

Professor Siegfried Gottwald was born on March 30, 1943 in Limbach-Oberfrohna in Saxonia where he also attended high school. He studied mathematics at the University of Leipzig from 1961 till 1966 and received his PhD in 1969. The supervisor of his thesis "Konstruktion von Zahlbereichen und die Grundlagen der Inhaltstheorie in einer mehrwertigen Mengenlehre" was Professor Dieter Klaua who, at the same time and independently of Professor Lotfi A. Zadeh [27], in the mid-1960s developed the idea of generalized sets with degrees of membership, called "mehrwertige Mengen" [23]–[26]. The main topic of Siegfried Gottwald's PhD thesis was the construction of classes of numbers within a many-valued

set theory (see also [4]).

After graduation Siegfried Gottwald joined the University of Leipzig, obtained the "facultas docendi" for the field of mathematics in 1972 and started to teach mathematics and logic. In 1977 he passed the Habilitation in mathematics with the thesis "Ein kumulatives System mehrwertiger Mengen" and became a Lecturer ("Hochschuldozent") in 1979 and an Associate ("außerordentlicher") Professor in 1987. He was promoted to Full Professor for „Nonclassical and Mathematical Logic" at Leipzig University in 1992, a position he held until his retirement in 2008. For many years, he served as Director of the "Institut für Logik und Wissenschaftstheorie", where his expert knowledge and his high social competence helped to master the smooth transition taking place in the sensitive period after the end of the German Democratic Republic. He also was Vice Dean of the Faculty of Social Sciences and Philosophy.

Siegfried Gottwald held visiting positions at Warsaw University and the Polish Academy of Sciences (1972 and 1973), at the Department of Philosophy at University of California, Irvine (1991), at the Department of Philosophy at Indiana University in Bloomington (1991 and 1998), and at the Department of Computer Science of the Technical University Darmstadt (1992).



Figure 2: Siegfried Gottwald lecturing at the Linz Seminar 2013.

He served in the Editorial Board of the journal "Fuzzy Sets and Systems" from its very beginning (during the last years as Area Editors for Logic) and

of other international journals, and he was named a "Distinguished Reviewer" of the "Zentralblatt MATH" for which he produced over 500 reviews (2012). He received Alcatel-Lucent-Foundation's (previously Alcatel-SEL-Foundation, 1991) Research Award "Technische Kommunikation" of the and became a Fellow of the International Fuzzy Systems Association (IFSA, 2009). The main fields of interest of Siegfried Gottwald were classical and many-valued logic, fuzzy sets and fuzzy logics and many related aspects, but also the history and philosophy of mathematics. Therefore, his scientific oeuvre covers several areas – only some of them can be mentioned here (a fairly complete list of publications in chronological order can be found online[1].

- First, expanding the results of his PhD thesis, he worked on the construction of classes of numbers within a many-valued set theory [4].
- In the Seventies, he investigated this many-valued set theory in detail [5]–[7], looking also at fuzzy sets of higher level [8] and making first steps toward fuzzy propositional logics [9]. Later on, he published about many aspects of fuzzy logics, including their axiomatization [15, 16].
- A major field of research deals with fuzzy relational equations and their solvability (see, e.g., [10, 11, 14]).
- Most recently, he published a survey paper on fuzzy sets and formal logics in the special issue of "Fuzzy Sets and Systems" celebrating the 50th Anniversary of Fuzzy Sets [3].
- He is also the (co-)author and co-editor of a number of monographs and textbooks on many-valued logic, fuzzy sets and fuzzy logics, both in German and in English [1,2,12,13,22].
- He co-edited several standard volumes about important mathematicians and the history of mathematics [17,19,20].



Figure 3: Siegfried Gottwald and Lluis Godo.

[1] www.sozphil.uni-leipzig.de/cm/philosophie/files/2014/04/SG-Publ-CHRON.pdf).

Siegfried Gottwald had a very special relationship to the Johannes Kepler University, Linz and to the "Linz Seminar on Fuzzy Set Theory". After Ulrich Höhle, Robert Lowen and myself had initiated this conference series in 1979, Siegfried Gottwald was one of the colleagues we wanted to invite from the very beginning. Unfortunately, in the Eighties the authorities in his home country did not allow him to travel to Austria. So we first met at conferences in Poznań (1983) and at the Wartburg Castle (1985), and in September 1989 we finally could send him an invitation to come to Linz in the following year. In September 1990, a few days before the German reunification, Siegfried Gottwald attended the 12th Linz Seminar on Fuzzy Set Theory and gave a most interesting talk on fuzzy relational equations. From the very first moment, he was fully integrated within this small group of colleagues working on mathematical aspects of fuzzy sets. In total, he attended this conference 24 times (between 1990 and 2014). He immediately became a permanent member of our Program Committee and, in 1996, 2005 and 2014, served as its Co-Chairman, responsible for the quality of the scientific program. At these occasions, Siegfried Gottwald co-edited two special issues of "Fuzzy Sets and Systems" [18,21] – a third one is nearly finished and can be published only posthumously.



Figure 4: Siegfried Gottwald with Ronald R. Yager.

On September 20, 2015, Professor Siegfried Gottwald passed away suddenly and unexpectedly. He is survived by his wife Waltraut, his children Carsten, Ivo and Siegrun, and four grandchildren. The community of researchers and colleagues in the area of fuzzy sets and fuzzy logics will remember him as an eminent contributor to the field who was always ready not only for interesting and stimulating discussions about mathematics and logic, but also enjoyed music very much (in particular that of Richard Wagner) and a good glass of wine.




Figure 5: Siegfried Gottwald with Petr Hájek (left) and Radko Mesiar (right).



Figure 6:Siegfried Gottwald and Radko Mesiar in Johannes Kepler's former living room in Linz.



Figure 7: Siegfried Gottwald in the Program Committee (from left: Didier Dubois, Radko Mesiar, Endre Pap, Tommaso Flaminio, Lluís Godo, Stephen E. Rodabaugh, S. G., Ulrich Höhle, and Susanne Saminger-Platz) of the Linz Seminar.

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