

PART 1

1.1. Leadership in High Level Synthesis. Already in 1975, being a post-doc at Univ. of Kiel's Informatics Institute, he started to work on High-Level Synthesis (HLS). Encouraged by Prof. Gerhard Zimmermann Peter Marwedel designed and implemented here the first European HLS. This design was a landmark, so that Peter Marwedel has been recognized worldwide in this area as the number 1. Marwedel's seminal paper was presented at DAC in 1978.

1.2. With MIMOLA he introduced retargetable compilation to EDA - long before compilers were a topic at EDA conferences. Marwedel's groundbreaking first paper was published already 25 years ago (in 1981) at a Microprogramming Workshop. Here his further work extended into design space exploration, where he is a key person worldwide. In the early nineties, he realized that compilers for embedded systems (ES) will become a very important topic and he extended his work on retargetable compilation toward ES design flow. The book "Code Generation for Embedded Processors" which he jointly edited with Gert Goossens, was published in 1995. This book is highly cited and one of the key references in the area.

1.3. As the author and implementer of the MIMOLA language Marwedel also provided already in 1975 an outstanding contribution to the history of computer hardware description languages (HDL). Marwedel's MIMOLA was the first fully synthesizable HDL in the world.

PART 2.

2.1. In 2003, Dr. Marwedel published his book "Embedded System Design" - An early ES contribution to curriculum development. This book shows new ways of integrating embedded systems into the computer science and computer engineering curricula. Due to the success of the original version, the book will be re-published as a paper back edition - more affordable to students worldwide. Another of his educational activity is using multimedia technology for teaching computer architecture and embedded systems.

2.2. His MIMOLA toolset MSS also supported VLIW architectures - many years before this term was invented. So he is co-founder of a methodology, being more recently subject of research at UC Berkeley and Dan Gajski's No Instruction Machines (NISC) proposal.

becoming mainstream, again decades after the first papers by Marwedel and his students.

2.3. Marwedel's more recent work focuses on the energy efficiency of embedded code. Meanwhile even supercomputing scenes have recognized, that memory cycles to memory outside the chip are the main hurdles stalling progress on the way to high performance and low energy consumption. In cooperation with the group of Prof. Francky Catthoor at the famous IMEC institute at Leuven, Belgium, Peter Marwedel's work on exploiting scratch pad memories for improving the efficiency of memory access is well-known throughout the world. Recently, the impact of such memories on worst case execution times has been added to the research scope. Marwedel's current focus on memory-architecture aware compilation is highly influential.

2.4. Under Marwedel's influence his former student Dr. Rainer Leupers is currently commercializing retargetable compiler technology through CoWare. During cooperation with Marwedel the members of Gert Goossens's group from the famous IMEC institute at Leuven, Belgium, created TARGET Compiler Technologies at Leuven. The methodology used by TENSILICA goes into a similar direction. He continues incubation of start-ups by the Dortmund technology centre ICD, which he is heading since 1997.

2.5. At Dortmund, Marwedel also supervised work on the automatic generation of test programs for processors. It is his new contribution, that the work aimed being able to test processors at full speed without using external testers. The work was published at DAC in 1995. The use of a constraint-logic programming language for bidirectional simulation and easy memory management was one of the key contributions.