

IEEE Distinguished Lecture

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Anfiteatro da Engenharia Elétrica.

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Process Simulation for Modern Microelectronics Technologies

The continuous demand for performance increase of miniaturized microelectronics devices, institutionalized by the ITRS roadmap, requires utmost utilization of all imaginable resources. Therefore, also Technology CAD (TCAD) tools have been designed to assist in development and engineering at all stages ranging from process simulation to device and circuit optimization. The main purpose of TCAD is the technology-development related cost reduction which currently amounts to 35% and is expected to rise to 40%, according to <<http://public.itrs.net>>. In particular the technology of the fabrication processes exhibits extraordinary complexity requiring extremely high manufacturing precision.

The presentation briefly sketches the evolution of microelectronics and demonstrates the state of the art. Some requirements in optimizing fabrication processes are presented showing the power of process simulation assisted technology development. Examples are given for etching and deposition, ion implantation, diffusion, and oxidation, A conclusion summarizes the main findings, and important directions for future research are recommended.

Siegfried Selberherr was born in Austria, in 1955. He received the degree of “Diplomingenieur” in Electrical Engineering and the doctoral degree in Technical Sciences from the “Technische Universität Wien” in 1978 and 1981, respectively. Dr. Selberherr has been holding the “venia docendi” on “Computer-Aided Design” since 1984. Since 1988 he has been the Chair Professor of the “Institut für Mikroelektronik”. From 1998 to 2005 he served as Dean of the “Fakultät für Elektrotechnik und Informationstechnik”. His current research topics are modeling and simulation of problems for microelectronics engineering.