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Semiconductor Reliability and Product Qualification

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Christopher Henderson received his B.S. in Physics from the New Mexico Institute of Mining and Technology and his M.S.E.E. from the University of New Mexico. Chris is the President and one of the founders of Semitracks Inc., a United States-based company that provides education and semiconductor training to the electronics industry. From 1988 to 2004, Chris worked at Sandia National Laboratories, where he was a Principal Member of Technical Staff in the Failure Analysis Department and Microsystems Partnerships Department. His job responsibilities have included failure and yield analysis of components fabricated at Sandia's Microelectronics Development Laboratory, research into the electrical behavior of defects, and consulting on microelectronics issues for the DoD. He has published over 25 papers at various conferences in semiconductor processing, reliability, failure analysis, and test. He has received two R&D 100 awards and two best paper awards. Prior to working at Sandia, Chris worked for Honeywell, BF Goodrich Aerospace, and Intel. Chris is a Senior Member of IEEE and EDFAS (the Electron Device Failure Analysis Society). He was the General Chair of the International Symposium for Testing and Failure Analysis (ISTFA) in 2007 and the General Chair of the IEEE Reliability Physics Symposium in 2016. At Semitracks, Chris teaches courses on failure and yield analysis, semiconductor reliability, and other aspects of semiconductor technology.

Reliability Engineering is an increasingly important discipline within the semiconductor industry. Today, we implement electronics in more applications that demand high levels of reliability, such as automotive, defense, and industrial. In the future, even our smart phones will require higher levels of reliability, as they become part of the electronics used for medical purposes. Reliability engineering encompasses a number of activities, including experimental testing to model existing failure mechanisms and uncover new ones, mathematical calculations to assess the reliability of our semiconductor devices in various use conditions and applications, product qualification to assess the fitness of our devices for a customer's use, and consultation on design issues, to make our devices more reliable. We will provide an overview of the various activities and introduce important topics and concepts for the new reliability, quality, or product engineer to understand.