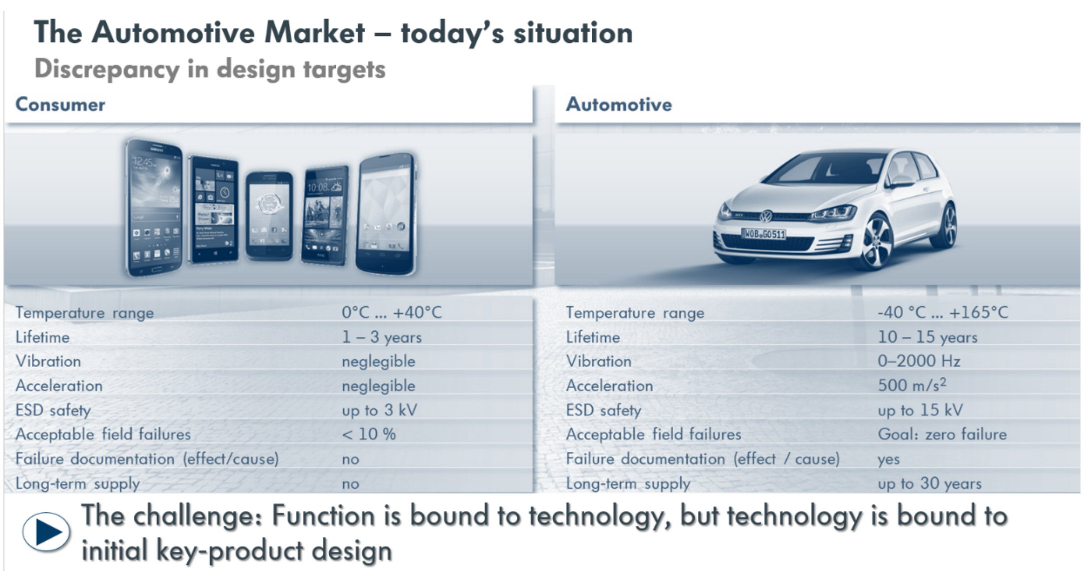
Automotive: what are the challenges for new technologies?

The requirements flow chain for microelectronics as well as for intelligent power electronics that is intended to be used for future e-mobility, infotainment and autonomous driving applications is changing in the same way as the whole automotive industry is in a transformation process. From a business perspective, the car becomes a product that integrates all possible variants of complex semiconductor based functions with makes it an attractive object for seed funding of even wider targets (e.g. AI) within various other industry sectors.

From a functional perspective, many hardware (incl. architecture) related requirements will need to follow new SW based requirements. From a HW/SW maintenance, security, reliability and cost perspective the automotive industry now requires high performance, low power and resilience capable (fail operational) robust technologies. Of course, this relates to chip, but as well also to corresponding construction and connections technologies (assembly) that interfere with automotive load scenarios. An obvious challenge for automotive is the semiconductor/assembly technology focused mass volume target product specification and its deviation from corresponding automotive specs. However, transparency about these deviations already opens cost effective compensation and technology enhancement opportunities.

This discussion group will strike a dialogue to focus on leading-edge technologies verification, validation and qualification approaches in order to also conclude on necessary change and extension scenarios (technology readiness process) to adapt those approaches to new technology generations as well as to corresponding application fields. General and application specific technology capability enhancement options will be discussed. For those that are interested to actively participate in the discussion group it should be noted that although 'automotive requirements' are behind this discussion, the 'solutions space' and methodology options is assumed to be of general nature and are in principle applicable to various high demanding industries as the automation industry, aviation and military.



Moderators:

Khai Nguyen received his Bachelor (confered with great distinction) and Ph.D. degrees in Electrical Engineering from Concordia University, Montreal, Quebec, Canada in 1994 and in 1999, respectively. He was a recipient of NSERC (Natural Sciences and Enegineering Research Council of Canada) awards twice. He was awarded Phoivos Ziogas Medal in 1994, and received Canadian Advanced Technology Award in 1997 for academic achievements.

In the last 10 years, he has been with NVIDIA. His reponsibilities include product-level reliability characterization and qualification, customer engagement. He is a voting member in JEDEC 14.1, 14.2, 14.3.

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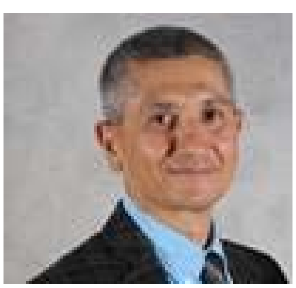
Andreas Aal leads the semiconductor strategy and reliability assurance activities within the electric-/electronic development department at Volkswagen, Germany, which he joined in 2011. His activities concentrate on technology capability enhancement of nodes down to 12 nm as well as optimization of power electronics for automotive applications. He leads two semiconductor related European projects and is a strong representative of the through-the-supply-chain-joint-development approach. Mr. Aal has been working within the semiconductor industry since 1998 holding different positions from engineering to management working on production monitoring, process and technology development, qualification, and failure analysis. He was involved in device optimization, the development of test structure design as well as new combined stress/measurement and data analysis methodologies for qualification and fWLR monitoring. Andreas (certified reliability professional) published and co-authored various papers, has given invited talks, served as reviewer for different Journals and has served in the technical and management committee for IEEE IIRW. He is a member of the IEEE Electron Devices, CPMT, Nuclear and Plasma Sciences, Reliability and Solid-State Circuits Societies and also a frequent participant / contributor of the JEDEC subcommittee 14.2. Since 2007 he is chair of the German ITG group 8.5.6 (VDE) on (f) WLR, reliability simulations and qualification.



Dr. Shalabh Tandon is the Director of Internet of Things (IOT) Product Q&R group that is responsible for qualifying products for this emerging market. The IOT division at Intel services the embedded, retail, industrial markets as well as the expanding automotive (ADAS or fully autonomous) markets where computational needs and workload complexities are increasing at a rapid pace.

Shalabh joined Intel in 1997 in the packaging quality and reliability group. Over his ~20 years at Intel, Shalabh has worked in the Corporate Quality Network (CQN) serving various functions. His tenure has included responsibilities in understanding thermomechanical behavior of polymers in semiconductors, especially from a reliability perspective; product testing for performance and quality using various functional sockets; qualification strategies for various semiconductor usage approaches. His current focus is both understanding the usage of semiconductors in the IOT space, especially automotive industry, and ensuring the products needed for these evolving markets are capable of meeting customer's computational and quality and reliability needs.

Shalabh holds a MSc in Chemistry from University of Pittsburgh & a Ph.D in Polymer Science & Engineer from University of Massachusetts, Amherst. He has published several technical articles in peer reviewed journals and holds a few patents.