

Scott A. Hareland / Medtronic

"An Integrated Dependability Framework for System Design and Architecture"

The reliability of a system is much more than the cumulative reliability of all of the parts. This tutorial will focus on a dependability framework that provides guidance and analysis methods for system engineers and architects for the prevention, removal, and tolerance to faults in a system. Methods and tools normally used during system architecture and development can be coupled with reliability analysis methods in the dependability framework to have significant improvements in system reliability, safety, and availability while maintaining realistic design efforts and expectations. While a focus on faults, physics of failure, and methods to improve component and product reliability will always be needed and studied by reliability engineers, this dependability framework drives early and top-down focus on the fundamental causes of faults, how those faults propagate into system failures, and how system design decisions can often provide more elegant and cost-effective solutions for achieving a dependable system.

Scott Hareland is a Medtronic Technical Fellow and a Distinguished Systems Engineer in the Neurological Restorative Therapies Group in Minneapolis, MN. Previously, he was the lead system architect on cryoablation-based surgical platforms in Medtronic's Cardiac Rhythm and Heart Failure Division. In addition, he has over ten years of experience in implantable cardiac devices and leads including sensor based systems, the industry's first implantable pacemaker designed for MRI environments, and numerous fault-tolerant design concepts. Prior to Medtronic, he was a reliability and device engineer at Intel Corporation working on advanced 3D transistor designs, CMOS integration of functional high-k dielectrics and complementary metal gates, and research on advanced dielectrics and soft error effects. He received the B.S.E.E. degree from Rice University and the M.S.E. and Ph.D. degrees from the University of Texas at Austin. He is a member of Phi Beta Kappa, Tau Beta Pi, and Eta Kappa Nu.