



## Reliability in the 21st Century

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Reliability is an engineering discipline that relies heavily on the application of probability and statistics. Changes in sensor, communications, and storage technologies are changing the nature of reliability field data. An increasing number of modern systems are being outfitted with sensors that capture information about how and when and under what environmental and operating conditions individual systems are being used. In some cases, the physical/chemical state of critical system components can also be quantified and reported. For many systems such information is being downloaded continuously into data farms. In addition, improvements in computing capabilities and investment in developing physics-based models for failure provide another important dimension of reliability information. There are many potential applications for using such data to improve safety and reduce costs but existing statistical methods for reliability assessment and prediction are inadequate for the tasks. This talk reviews some particular applications where the modern field reliability data are used and explores some of the opportunities to use modern reliability data to provide stronger statistical/physical methods that can be used to operate and predict the performance of systems in the field. We also provide some examples of recent technical developments designed to be used in such applications and outline remaining challenges.

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