# Joint Seminar of Statistical Engineering Division, and Software Diagnostic and Conformance Testing Division (Information Technology Laboratory)

**Monday April 28, 1997, 11:00 am**

**Lecture Room D, Administration Bldg.**

**NIST**

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# Improved Engineering of the Software Manufacturing Process

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The software industry is decades behind the hardware industry in terms of the way it engineers systems. Adopting some key concepts from hardware manufacturing and statistical control will help in improving the productivity of the software manufacturing process and the quality of its products. Towards this end I propose a new paradigm, Statistical Software Engineering. Statistical Software Engineering conceptualizes the process of engineering a large software system as a statistical process and uses a variety of ideas for controlling and improving the process. To implement this paradigm I will propose a three-pronged approach. The three points I will discuss are: improvement in the process by introducing new technology, scientific experimentation, and management based on measurements.

To improve the process one needs new technology, discipline of scientific experimentation before making changes, and managing the process so that it becomes predictable/stable. The predictability comes by measuring the process and analyzing/benchmarking the results. I will describe all of these facets in context of three examples. The AETG (Automatic Efficient Test Generator) system is an example of a new exciting technology which is being used to improve the testing process; scientific experiments are being used to improve database performance; and finally metrics are used to manage and improve development processes.

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AETG system is a registered trademark of Bellcore.

Sid Dalal is Chief Scientist in Information Sciences & Technologies Research Lab at Bellcore. He started his industrial research career in Bell Labs, Math Research Center, and joined Bellcore's applied research at its inception.

He works in the areas of Software Engineering, Probability, Reliability, and Software Metrics. He was greatly involved in the Risk Analysis of the Challenger disaster on behalf on an NRC committee, and he received a major award for this effort. He was a member of a National Academy of Sciences panel on Software Engineering which recently produced an NRC report on Software Engineering.

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