

## Trustworthy Computing and Communications: A National Imperative

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It is abundantly clear that a high-intensity focus on “trustworthy computing and communications” must become a national imperative. This point has been driven home by the events of September 11<sup>th</sup>, and subsequent analysis of the pervasive role of highly vulnerable information technology in the monitoring and control of most elements of the nation’s critical infrastructure. On a less catastrophic scale, though, the relentlessly increasing frequency and severity of worms, viruses, and security breaches, and the relentlessly increasing difficulty of administering systems, threaten the further expansion of information technology into all aspects of our lives and our economy.

The state of research in this field is not as dire as some have asserted. However, there can be no doubt that much remains to be done. Additionally, the gap between knowledge and practice is extraordinarily large. Finally, there has been far too little focus on technical approaches to reducing the “human error” (e.g., misconfiguration) that frequently is fingered when a problem occurs – “human error” that is an inevitable consequence of inept system design.

Important long-term research topics in this space (all of which have been cribbed from others) include:

- System development tools that reduce the frequency and severity of bugs
- System administration tools that reduce the frequency and severity of configuration errors
- Specification techniques for security policies that are meaningful to system administrators and end-users, so that when conformance of an implementation to a specification is mechanically verified, the desired outcome is achieved
- Meaningful metrics of system security, stability, etc., so that these attributes can be “sold” and thus their development overhead and operational overhead can be justified and compensated
- Auditing techniques

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Lazowska was educated at Brown University and at the University of Toronto. His research and teaching concern the design, implementation, and analysis of high-performance computing and communication systems. Lazowska is a Member of the National Academy of Engineering, and a Fellow of ACM, IEEE, and AAAS. He was selected to deliver the 1996 University of Washington Annual Faculty Lecture, and to receive the 1998 University of Washington Outstanding Public Service Award. He chaired the UW Department of Computer Science & Engineering from 1993-2001; under his leadership, the Department received the inaugural University of Washington Brotman Award for Instructional Excellence, four CSE faculty members were recognized with the University of Washington Distinguished Teaching Award, one with the University of Washington Distinguished Graduate Mentor Award, and seven with Sloan Research Fellowships. Nineteen Ph.D. students and twenty-three Masters students have completed their degrees working with him.

Lazowska is a member of ACM Council and of the Board of Directors of the Computing Research Association (which he chaired from 1997-2001). He recently completed a 6-year term on the National Research Council's Computer Science and Telecommunications Board, and currently serves on the NRC Committee on Improving Learning with Information Technology and Committee on Science and Technology for Countering Terrorism – Panel on Information Technology. From 1995-2001 he served on (and in 1998 and 1999 he chaired) the NSF Advisory Committee for Computer and Information Science and Engineering. He is Vice Chair of the DARPA ISAT Study Group, which he joined in 1998. He is a member of the Microsoft Research Technical Advisory Board, a board member or technical advisor to a number of high-tech companies and venture firms, and a Trustee of Lakeside School, a co-educational independent school in Seattle.