In this mini-series, I am responding to students who have asked me for ideas on what they could do in their PhD thesis research in the field of INFOSEC.

(3) Denial of service: threats and countermeasures.

For a more technically-oriented and theoretical dissertation, perhaps you would like to lay out a theoretical structure explaining how denial of service attacks can be created for any system. You would detail many examples of DoS attacks and compare and contrast them to develop a theoretical framework for classifying, understanding and countering such attacks. You would analyze and describe proposals in IPv6 and RFCs currently circulating in the IP community for tightening up defenses against DoS. Maybe you could arrange to interview luminaries such as Dave Dittrich, Peter Northcutt, Robert Moskowitz and others and compare and contrast their perspectives. The thesis could conclude with your opinion on proposals for changes in the TCP/IP and other aspects of the Internet to prevent further DoS attacks.

(4) Artificial intelligence and security countermeasures.

For a more computer-science oriented thesis -- AI technology and advanced pattern recognition are critical components of many aspects of today's security technology. This thesis would allow you to learn a great deal about heuristic systems, neural networks, probabilistic modeling, Markov chaining, biometric authentication, and intrusion detection. You would study the literature and interview research scientists, including developers at commercial firms, to analyze and describe the direction of this exciting area of work. Perhaps you could study the actual real-world implementation of such techniques and summarize your analysis of the advantages and disadvantages (or costs and benefits) of the different approaches. Naturally, you would want to finish with concrete recommendations and a picture of what the future holds.

. . . and a couple more topics in the next episode.

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AtomicTangerine is the Internet's first e-business venture consulting firm, combining the disciplines of venture capital, technology innovation and strategic consulting to create category killers and incubate new industries for companies of all sizes and at all stages of evolution. AtomicTangerine headquarters are in the San Francisco Bay Area and we have offices in New York, London, Tokyo, Washington DC, Boston, Denver and Seattle/Tacoma. Visit our new Web site at <www.atomictangerine.com>.
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