D. Scott Alexander

75 Hillcrest Road
Warren, NJ 07059
salex@dsl.cis.upenn.edu

mobile: +1 908 875 9633 home: 908 542 1986 fax: 908 542 1886

Education

University of Pennsylvania, Philadelphia, Pennsylvania
School of Engineering and Applied Science
Ph.D. in Computer and Information Science, December 1998
Dissertation: A Generalized Computing Model of Active Networks
Advisor: Jonathan M. Smith
Awarded Rubinoff Award for innovate applications of computer technology

M.S.E. in Computer and Information Science, August 1994
Dissertation: Embedding High Speed ATM in Unix IP

Rice University, Houston, Texas
B.A. in Computer Science, May 1986.

Research Experience

Senior Member of Technical Staff, April 2002 – February 2004.
System Detection, Inc.
Took the proof-of-concept implementation of Columbia University's Unsupervised Probabilistic Anomaly Detector and re-implemented it for the commercial market. Adapting and extending based on results of field trials.

Chief Architect, Engine Group, July 2000 – February 2002.
Activium
Lead effort to build a runtime system for the eXa language. The eXa language is the first commercial development of general Active Networking technology. The eXa language runtime is based on the ALIEN work from the University of Pennsylvania. Its design merges aspects of ALIEN with the design of Netscript and then simplifies the overall system design to focus on the crucial market requirements. The result was a system which could be used by customers to program networking applications.

Member of Technical Staff, Bell Laboratories, October 1998 – July 2000.
Lucent Technologies
Involved in the NEPPI project which explored how to apply active networking technology to the enterprise environment. Investigated and designed NEPPI port to NPU hardware. The NEPPI project examined how to simplify the principles of active networking to provide flexibility to software developers within network appliance manufacturers.

Research Fellow, Distributed Systems Laboratory, August 1995 – October 1998.
University of Pennsylvania
Conducted research as part of the SwitchWare project in the area of active networks with an emphasis on extendibility and flexibility. Designed and implemented one of the first active node architectures and implemented it in Caml. The architecture provides the ability to extend the node's functionality via programs loaded from local storage or from the network (via inband or out of band mechanisms). Demonstrated the utility of this approach by implementing a network bridge for 100 Mb/s Ethernet composed of programs capable of transitioning between spanning tree algorithms in a controlled and reliable manner.

Intern, Bell Communications Research, June 1997 – January 1998.
Technology transfer between active networks groups at Penn and Bellcore. Investigated how applications designed at Bellcore could be better supported by active networks and how these applications influence the design of an active network infrastructure.

Research Fellow, Distributed Systems Laboratory, University of Pennsylvania August 1993 – August 1994.
Investigated layering of IP and TCP over an ATM network. Designed and implemented software necessary to connect AIX IP with ATM cards designed at Penn. Measured and analyzed performance results.

Publications

Journal Publications

D. Scott Alexander , Paul B. Menage, Angelos D. Keromytis, William A. Arbaugh, Kostas G. Anagnostakis, and Jonathan M. Smith. "The Price of Safety in an Active Network," Journal of Communications and Networks (JCN), special issue on programmable switches and routers, vol. 3, no. 1, pp. 4 – 18, March 2001.

D. Scott Alexander, William A. Arbaugh, Angelos D. Keromytis, Steve Muir, and Jonathan M. Smith. "Secure Quality of Service Handling (SQoSH)," IEEE Communications Magazine, vol. 38, no. 4, pp. 106 – 112, April 2000

D. Scott Alexander, William A. Arbaugh, Angelos D. Keromytis, and Jonathan M. Smith. "Safety and Security of Programmable Network Infrastructures," IEEE Communications Magazine, issue on Programmable Networks, v. 36, no. 10, pp. 84–92.

D. Scott Alexander, William A. Arbaugh, Michael W. Hicks, Pankaj Kakkar, Angelos D. Keromytis, Jonathan T. Moore, Carl A. Gunter, Scott M. Nettles, and Jonathan M. Smith. "The SwitchWare Active Network Architecture," IEEE Network Special Issue on Active and Controllable Networks, v. 12, no. 3, pp. 29–36.

D. Scott Alexander William A. Arbaugh, Angelos D. Keromytis, and Jonathan M. Smith. "A Secure Active Network Architecture: Realization in SwitchWare," IEEE Network Special Issue on Active and Controllable Networks, v. 12, no. 3, pp 37–45.

Book Chapter

D. Scott Alexander, William A. Arbaugh, Angelos D. Keromytis, and Jonathan M. Smith. "Security in Active Networks," *Secure Internet Programming: Security Issues for Mobile and Distributed Objects*, Springer-Verlag Lecture Notes in Computer Science State-of-the-Art series, LNCS 1603, pp. 433–451.

Refereed Conference Publications

D. Scott Alexander and Jonathan M. Smith. "The Architecture of ALIEN," First International Working Conference on Active Networks, (LNCS 1653, pp. 1–12), Berlin, Germany, June/July, 1999.

Michael Hicks, Jonathan T. Moore, D. Scott Alexander, Carl A. Gunter, and Scott M. Nettles. "PLANet: An Active Internetwork," IEEE Infocom '99, New York, New York.

D. Scott Alexander, Marianne Shaw, Scott M. Nettles, and Jonathan M. Smith. "Active Bridging," SIGCOMM '97, Cannes, France, September 1997.

D. Scott Alexander, C. Brendan S. Traw, and Jonathan M. Smith. "Embedding High Speed ATM in Unix IP," Usenix 1994 High-Speed Networking Symposium, Oakland, CA, August 1994.

Other

D. Scott Alexander, Michael W. Hicks, Pankaj Kakkar, Angelos D. Keromytis, Marianne Shaw, Jonathan T. Moore, Carl A. Gunter, Trevor Jim, Scott M. Nettles, and Jonathan M. Smith. "The SwitchWare Active Network Implementation" The 1998 ACM SIGPLAN Workshop on ML.

D. Scott Alexander, Bob Braden, Carl A. Gunter, Alden W. Jackson, Angelos D. Keromytis, Gary J. Minden, and David Wetherall. "Active Network Encapsulation Protocol (ANEP)," Active Networks Group, DARPA Active Networks Project, August 1997.

D. Scott Alexander. "Ethernet Telephones," Quarterly Report, The Flight Projects Office Information System Testbed (FIST), August 1991.

Additional Work Experience

Jet Propulsion Laboratory January 1990 – June 1995.
Technical Group Leader: Responsible for subgroup performing design, implementation, testing, and delivery of Command subsystem. Supervised 4.5 employees and managed $1,000,000 budget.

Member of Technical Staff: Designed/ported and implemented a system for the translation of commands into binary messages for transmission to spacecraft. Also worked with Motif and X to build user interfaces. Worked on Sun-3s and Sun-4s using C.

Department of Computer Science, Univ. of PA. May 1986 – January 1990.
Systems Programmer: Maintained and programmed Vaxes, Sun-3s, Sun-4s, and HPs running various flavors of Unix. Provided primary and secondary Unix support. Worked extensively with a variety of packages for those systems including The X Window System.

Susquehanna Investment Group November 1989 – December 1989.
Consultant: Designed and implemented a common, coherent filesystem layout for multiple Suns which were constrained to use a mixture of NFS-mounted and local-mounted filesystems.

Human Designed Systems January 1989 – June 1989
Consultant: Planned and ported the KA9Q TCP/IP to an embedded 80186 for an X Terminal.

Department of Computer Science, Rice University June 1983 – May 1986
Worked with networks and programming environments under Unix and VMS. Worked extensively with the Ethernet-based network at Rice running TCP/IP under UNIX 4.1 and 4.2 BSD, VMS and on the IBM PC. Also worked on a project to develop an implementation of TCP/IP for VMS Was jointly responsible for daily maintenance of the network, and for hardware maintenance of the research VAXes.

Teaching Experience

Teaching Assistant, University of Pennsylvania September 1996 – May 1997
Software Engineering: Helped to design programming exercises including the major assignment which consisted of dividing the entire class into six groups of three students each and having each group design and implement a portion of an information browser. Presented lectures and assisted students in learning to see the project as a whole rather than focusing only on the part assigned to a single group.

Programming Languages and Techniques: Lectured and offered help to students during two recitations per week. Managed graders for half the semester and developed one-third of the laboratory exercises.

Teaching Assistant, Rice University January – May 1985
Provided assistance to non-majors who were learning to program. Class included instruction in Pascal and nroff.