Carl Livadas

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Objective

Lead research and development of novel and exciting technologies that make an impact. Interested in online advertising, content relevance, ranking, and revenue optimization.

Education

Massachusetts Institute of Technology Cambridge, MA

Doctor of Philosophy in Electrical Engineering and Computer Science, July 2003
Master of Engineering in Electrical Engineering and Computer Science, Sept. 1997
Master of Science in Aeronautics and Astronautics, February 1996

Bachelor of Science in Computer Science, September 1993
Bachelor of Science in Aeronautics and Astronautics, June 1993

Engineering Coursework: Theory of Computation, Computer Architecture, Data Communication Networks, Parallel and VLSI Computation, Randomized Algorithms, Distributed Algorithms, Computer Language Eng., Software Eng., Advanced Linear Control Systems, Principles of Optimal Control, Dynamics, Multivariable Control Systems, Stochastic Estimation and Control, Automatic Control.

Non-Engineering Coursework: Finance Theory, Entrepreneurship Courses, and Macroeconomics.

Phillips Academy Andover, MA
Graduated with Honors, June 1989

Honors

Barger Fellow, BBN Technologies, 2003
Member of the Massachusetts B Chapter of the TBΠ National Engineering Honor Society.
Member of the Massachusetts BΘ Chapter of the HKN National Electrical Engineering Honor Society.

Experience

KAYAK Sunnyvale, CA
Director of Engineering Apr 2010–Present
Principal Scientist Apr 2009–Apr 2010
Leading the engineering efforts of KAYAK's Sunnyvale office focusing on KAYAK's email, deals, online advertising, and parts of the mobile application products. As a principal scientist, focused on efforts to regionalize/personalize KAYAK's products and optimize performance.

Intel Corporation Santa Clara, CA
Research Scientist, Communication Technology Lab, Corporate Technology Group Jan 2008–Apr 2009
Research Scientist (Consulting), Intel Research Santa Clara (IRSC) Oct 2006–Jan 2008
Contributing to several aspects of the ***Distributed Detection and Inference*** **(DDI)** project; a collaborative worm detection system. Designed and implemented: 1) an adaptive local detector that adjusts the threshold of issuing alarms based on a learned model of its behavior, 2) a faithful analytic model of the behavior of DDI; this model is critical in understanding the behavior of the system, evaluating its performance and scalability properties, and exploring its parameter space, and 3) efficient and scalable gossip-based messaging and membership services for DDI.
Manager: Dr. Eve M. Schooler

BBN Technologies Cambridge, MA
Network Scientist, Internetwork Research Department September 2003–October 2006
Conducted cutting edge research in computer networks. Projects included: ***ZombieStones*** — A system that leverages machine learning techniques to identify network connections that are part of suspicious botnets; ***IP-SPOOR*** — An entropy-based study of how to place network traffic monitors for effective IP packet traceback; ***Stepping Stones*** — A system that identifies interactive connections that are used in sequence to obfuscate the origin of a cyber-attack; ***Stingray*** — An insider threat detection system that uses Bloom filters to efficiently log large amounts of network traffic and principal components analysis and machine learning techniques to detect network traffic anomalies; ***Performance Evaluation of a Proprietary Network*** — An evaluation of the performance of a proprietary network.
Manager: Dr. W. Timothy Strayer

MIT, Laboratory for Computer Science Cambridge, MA
Research Assistant, Theory of Distributed Systems Group January 1999–August 2003

Designed, modeled, and analyzed (both formally and through simulation) a variant of the Scalable Reliable Multicast (SRM) protocol that exploits packet loss locality through caching.
Research Advisor: Prof. Nancy A. Lynch.

MIT, $50K Entrepreneurship Competition Cambridge, MA
Semi-finalist, Prosopa.com January 2000–May 2000
Prosopa.com leveraged audio and video technology developed at the MIT AI Lab to deliver photo-realistic talking faces driven by text or audio. Prosopa.com's target markets included personalized video advertisements, customer support applications, and automated news-readers.

IBM, Thomas J. Watson Research Center Yorktown Heights, NY
Summer Intern, Commercial Parallel Systems Group Summer 1999
Researched the area of persistent TCP connections, a feature included in HTTP 1.1. Developed a simulator to evaluate the performance of persistent TCP connections between proxy and back-end servers.

MIT, $50K Entrepreneurship Competition Cambridge, MA
Semi-finalist, FairTrust, Inc. (now OpenRatings, Inc.) January 1999–May 1999
FairTrust, Inc. delivered consumer-to-consumer trustworthiness rating services to online communities such as E-bay, Inc. FairTrust, Inc. has since transformed itself into OpenRatings, Inc.

MIT, Laboratory for Computer Science Cambridge, MA
Research Assistant, Theory of Distributed Systems Group June 1996–Jan. 1997 & June 1997–Jan. 1999
Participated in research involving the modeling and verification of hybrid systems using Hybrid I/O Automata. Performed modeling and verification of Raytheon Corporation's Personal Rapid Transit system (PRT 2000^{TM}) and the Traffic Alert and Collision Avoidance System (TCAS) of commercial aircraft.
Research Advisor: Prof. Nancy A. Lynch.

MIT, Department of Electrical Engineering and Computer Science Cambridge, MA
Teaching Assistant
Math for Computer Science (6.042), Spring 2000, Lab. in Software Eng. (6.170), Spring 1997, Lab. in Software Eng. (6.170), Spring 1996, Computer Language Eng. (6.035), Fall 1995.

MIT, Department of Aeronautics and Astronautics Cambridge, MA
Research Assistant, Space Engineering Research Center September 1993–August 1995
Developed a formulation of $\mathcal{H}_2$ robustness criteria for systems involving real parametric uncertainties in terms of linear matrix inequalities (LMIs) and an iterative robust $\mathcal{H}_2$ controller synthesis scheme.
Research Advisor: Prof. Stephen R. Hall.

Leadership

Member of the Quality of Life Taskforce, BBN Technologies January 2004–January 2005
MIT, Hellenic Students' Association Cambridge, MA
President March 1994–February 1995

Proficiencies

Computer Skills: C/C++, Bash/Perl, Hadoop/Hive, Weka, MySQL, MATLAB, *ns* (Tcl/C++), LaTeX.
Languages: English, French, and Greek.

Publications

Conference/Workshop Papers

[1] J. M. Agosta, C. Diuk-Wasser, J. Chandrashekar, and C. Livadas, "An adaptive anomaly detector for worm detection," in *Second Workshop on Tackling Computer Systems Problems with Machine Learning Techniques (SysML'07)*, (Cambridge, MA), Apr. 2007. Co-located with NSDI'07.

[2] C. Livadas, R. Walsh, D. Lapsley, and W. T. Strayer, "Using Machine Learning Techniques to Identify Botnet Traffic," in *Proc. IEEE LCN Workshop on Network Security (WoNS'06)*, (Tampa, FL), Nov. 2006.

[3] W. T. Strayer, R. Walsh, C. Livadas, and D. Lapsley, "Detecting Botnets with Tight Command and Control," in *Proc. 31st Conference on Local Computer Networks (LCN'06)*, (Tampa, FL), Nov. 2006.

[4] W. T. Strayer, C. Jones, B. Schwartz, J. Mikkelson, and C. Livadas, "Architecture for Multi-Stage Network Attack Traceback," in *Proc. IEEE LCN Workshop on Network Security (WoNS 2005)*, (Sydney, Australia), Nov. 2005.

[5] C. Livadas and I. Keidar, "Caching-Enhanced Scalable Reliable Multicast," in *Proc. International Conference on Dependable Systems and Networks (IEEE/DSN'04)*, (Florence, Italy), pp. 253–262, IEEE Computer Society, July 2004.

[6] C. Livadas and N. A. Lynch, "A Formal Venture into Reliable Multicast Territory," in *Proc. 22nd International Conference on Formal Techniques for Networked and Distributed Systems (FORTE'02)*

(D. A. Peled and M. Y. Vardi, eds.), vol. 2529 of *Lecture Notes in Computer Science*, (Houston, TX), pp. 146–161, Springer-Verlag, Nov. 2002.

[7] C. Livadas, I. Keidar, and N. A. Lynch, "Designing a Caching-Based Reliable Multicast Protocol," in *Proc. International Conference on Dependable Systems and Networks (IEEE/DSN'01), Fast Abstracts Supplement*, (Göteborg, Sweden), pp. B44–B45, IEEE Computer Society, July 2001.

[8] C. Livadas, J. Lygeros, and N. A. Lynch, "High-Level Modeling and Analysis of TCAS," in *Proc. 20th IEEE Real-Time Systems Symposium (RTSS'99)*, (Phoenix, Arizona), pp. 115–125, IEEE Computer Society, Dec. 1999.

[9] C. Livadas and N. A. Lynch, "Formal Verification of Safety-Critical Hybrid Systems," in *Hybrid Systems: Computation and Control (HSCC'98)* (T. A. Henzinger and S. Sastry, eds.), vol. 1386 of *Lecture Notes in Computer Science*, pp. 253–272, Springer-Verlag, 1998. The First International Workshop, Hybrid Systems: Computation and Control (HSCC'98) took place in Berkeley, California, in April 1998.

[10] K. Y. Yang, C. Livadas, and S. R. Hall, "Using Linear Matrix Inequalities to Design Controllers for Robust $\mathcal{H}_2$ Performance," in *Proc. AIAA Guidance Navigation and Control Conference*, (San Diego, CA), July 1996.

[11] K. Y. Yang, C. Livadas, and S. R. Hall, "On the Utility of Tensor Inequalities for Robustness Analysis," in *Proc. AIAA Guidance Navigation and Control Conference*, (Baltimore, MD), pp. 122–131, July 1995.

Book Chapters and Journal Papers

[1] W. T. Strayer, D. Lapsley, R. Walsh, and C. Livadas, *Botnet Detection: Countering the Largest Security Threat*, ch. Botnet Detection Based on Network Behavior. Springer-Verlag, To appear 2007/2008.

[2] C. Livadas, J. Lygeros, and N. A. Lynch, "High-Level Modeling and Analysis of the Traffic Alert and Collision Avoidance System (TCAS)," *Proceedings of the IEEE, Special Issue on Hybrid Systems: Theory & Applications*, vol. 88, pp. 926–948, July 2000.

Technical Reports

[1] C. Livadas and I. Keidar, "The Case for Exploiting Packet Loss Locality in Multicast Loss Recovery," Technical Report MIT/LCS/TR-867, Lab. for Computer Science, MIT, Cambridge, MA, Oct. 2002.

[2] C. Livadas and N. A. Lynch, "A Formal Venture into Reliable Multicast Territory," Technical Report MIT/LCS/TR-868, Lab. for Computer Science, MIT, Cambridge, MA, Nov. 2002.

Unpublished Manuscripts

[1] C. Livadas, N. A. Lynch, T. Nguyen, and A. Zakhor, "Correctness and Performance Analysis of a Distributed Video Streaming Protocol." Unpublished Manuscript, July 2002.

[2] C. Livadas, "An Evaluation of Three Application-Layer Multicast Protocols." Unpublished Manuscript, PhD Area Exam Report, Sept. 2002.

Theses

[1] C. Livadas, *Formally Modeling, Analyzing, and Designing Network Protocols — A Case Study on Retransmission-Based Reliable Multicast Protocols*. Doctor of Philosophy Thesis, Dept. of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, July 2003.

[2] C. Livadas, "Formal Verification of Safety-Critical Hybrid Systems," Master of Engineering Thesis, Dept. of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, MA, Sept. 1997.

[3] C. Livadas, "Optimal $\mathcal{H}_2$/Popov Controller Design Using Linear Matrix Inequalities," Master of Science Thesis in Aeronautics and Astronautics, MIT, Feb. 1996.

[4] C. Livadas, "Data Locality on the Alewife Machine in the Barnes-Hut N-body Application," Bachelor of Science Thesis in Electrical Engineering and Computer Science, MIT, Sept. 1993.

Academic Activities

Intel Corporation: Intel liaison for Intel Corporate Research Grant to Prof. Wu-chang Feng of Portland State University to conduct research in leveraging Intel platform functionality to ensure authenticity and integrity in online game P2P communications.

Technical Program Committee: Network Computing and Applications (NCA'07), Network Computing and Applications (NCA'08)

Session Chair: Reliable Multicast session of 2005 IEEE Symposium on Network Computing and Applications (NCA'05), Cambridge, MA.

Journal Reviewer: Transactions on Mobile Computing, Transactions on Computers — Special Issue on Autonomic Computing, Transactions on Automatic Control — Special Issue on Hybrid Systems, Theoretical Computer Science — AMAST Workshop on Real-Time Systems (ARTS), ACTA Informatica.

Conference Reviewer: IEEE Symposium on Network Computing and Applications, Joint Conference of the IEEE Computer and Communications Societies (IEEE/INFOCOM), ACM Symposium on Principles of Distributed Computing (ACM/PODC), Conference on Decision and Control (IEEE/CDC)

Background

US and Greek Citizenship.

References

Prof. Nancy A. Lynch
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Professor of Electrical Engineering and Computer Science
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Communication Technology Lab (CTL)
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